NASA PATENT ABSTRACTS BIBLIOGRAPHY

A CONTINUING BIBLIOGRAPHY

Section 1 • Abstracts

JUNE 1990

(NASA-SP-7039(37)-Sect-1) NASA PATENT ABSTRACTS BIBLIOGRAPHY: A CONTINUING BIBLIOGRAPHY. SECTION 1: ABSTRACTS (SUPPLEMENT 37) (NASA) 43 p CSCL 05B

N90-25698

Unclas
00/82 0291563

ACCESSION NUMBER RANGES

Bibliography Number	*STAR Accession Numbers*
NASA SP-7039(04) SEC 1	N69-20701 - N73-33931
NASA SP-7039(12) SEC 1	N74-10001 - N77-34042
NASA SP-7039(13) SEC 1	N78-10001 - N78-22018
NASA SP-7039(14) SEC 1	N78-22019 - N78-34034
NASA SP-7039(15) SEC 1	N79-10001 - N79-21993
NASA SP-7039(16) SEC 1	N79-21994 - N79-34158
NASA SP-7039(17) SEC 1	N80-10001 - N80-22254
NASA SP-7039(18) SEC 1	N80-22255 - N80-34339
NASA SP-7039(19) SEC 1	N81-10001 - N81-21997
NASA SP-7039(20) SEC 1	N81-21998 - N81-34139
NASA SP-7039(21) SEC 1	N82-10001 - N82-22140
NASA SP-7039(22) SEC 1	N82-22141 - N82-34341
NASA SP-7039(23) SEC 1	N83-10001 - N83-23266
NASA SP-7039(24) SEC 1	N83-23267 - N83-37053
NASA SP-7039(25) SEC 1	N84-10001 - N84-22526
NASA SP-7039(26) SEC 1	N84-22527 - N84-35284
NASA SP-7039(27) SEC 1	N85-10001 - N85-22341
NASA SP-7039(28) SEC 1	N85-22342 - N85-36162
NASA SP-7039(29) SEC 1	N86-10001 - N86-22536
NASA SP-7039(30) SEC 1	N86-22537 - N86-33262
NASA SP-7039(31) SEC 1	N87-10001 - N87-20170
NASA SP-7039(32) SEC 1	N87-20171 - N87-30248
NASA SP-7039(33) SEC 1	N88-10001 - N88-20253
NASA SP-7039(34) SEC 1	N88-20254 - N88-30583
NASA SP-7039(35) SEC 1	N89-10001 - N89-20085
NASA SP-7039(36) SEC 1	N89-20086 - N89-30155
NASA SP-7039(37) SEC 1	N90-10001 - N90-20043

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NASA

PATENT ABSTRACTS BIBLIOGRAPHY

A CONTINUING BIBLIOGRAPHY

Section 1 • Abstracts

Annotated references to NASA-owned inventions covered by U.S. patents and applications for patent that were announced in *Scientific and Technical Aerospace Reports (STAR)* between January 1990 and June 1990.

National Aeronautics and Space Administration
Office of Management
Scientific and Technical Information Division
Washington, DC 1990

This supplement is available from the National Technical Information Service (NTIS), Springfield, Virginia 22161, price code A03.

INTRODUCTION

Several thousand inventions result each year from the aeronautical and space research supported by the National Aeronautics and Space Administration. The inventions having important use in government programs or significant commercial potential are usually patented by NASA. These inventions cover practically all fields of technology and include many that have useful and valuable commercial application.

NASA inventions best serve the interests of the United States when their benefits are available to the public. In many instances, the granting of nonexclusive or exclusive licenses for the practice of these inventions may assist in the accomplishment of this objective. This bibliography is published as a service to companies, firms, and individuals seeking new, licensable products for the commercial market.

The *NASA Patent Abstracts Bibliography (NASA PAB)* is a semiannual NASA publication containing comprehensive abstracts and indexes of NASA-owned inventions covered by U.S. patents and applications for patent. The citations included in *NASA PAB* were originally published in NASA's *Scientific and Technical Aerospace Reports (STAR)* and cover *STAR* announcements made since May 1969.

For the convenience of the user, each issue of *NASA PAB* has a separately bound Abstract Section (Section 1) and Index Section (Section 2). Although each Abstract Section covers only the indicated six-month period, the Index Section is cumulative covering all NASA-owned inventions announced in *STAR* since 1969. Thus a complete set of *NASA PAB* would consist of the Abstract Sections of Issue 04 (January 1974) and Issue 12 (January 1978) and the Abstract Section for all subsequent issues and the Index Section for the most recent issue.

The 76 citations published in this issue of the Abstract Section cover the period January 1990 through June 1990. The Index Section references over 4600 citations covering the period May 1969 through June 1990.

ABSTRACT SECTION (SECTION 1)

This *PAB* issue includes 10 major subject divisions separated into 76 specific categories and one general category/division. (See Table of Contents for the scope note of each category, under which are grouped appropriate NASA inventions.) This scheme was devised in 1975 and revised in 1987 in lieu of the 34 category divisions which were utilized in *PAB* supplements (01) through (06) covering *STAR* abstracts from May 1969 through January 1974. Each entry in the Abstract Section consists of a *STAR* citation accompanied by an abstract and, when appropriate, a key illustration taken from the patent or application for patent. Entries are arranged by subject category in order of the ascending NASA Accession Number originally assigned for *STAR* to the invention. The range of NASA Accession Numbers within each issue is printed on the inside front cover.

Abstract Citation Data Elements: Each of the abstract citations has several data elements useful for identification and indexing purposes, as follows:

NASA Accession Number
NASA Case Number
Inventor's Name
Title of Invention
U.S. Patent Application Serial Number
U.S. Patent Number (for issued patents only)
U.S. Patent Office Classification Number(s)
(for issued patents only)

These data elements are identified in the Typical Citation and Abstract and in the indexes.

INDEX SECTION (SECTION 2)

The Index Section is divided into five indexes. These indexes are cross-indexed and are used to locate a single invention or groups of inventions.

Subject Index: Lists all inventions according to appropriate alphabetized technical term and indicates the related NASA Case Number, the Subject Category Number, and the Accession Number.

Inventor Index: Lists all inventions according to alphabetized names of inventors and indicates the related NASA Case Number, the Subject Category Number, and the Accession Number.

Source Index: Lists all inventions according to alphabetized source of invention (i.e., name of contractor or government installation where invention was made) and indicates the related NASA Case Number, the Subject Category Number, and the Accession Number.

Number Index: Lists inventions in order of ascending (1) NASA Case Number, (2) U.S. Patent Application Serial Number, (3) U.S. Patent Classification Number, and (4) U.S. Patent Number and indicates the related Subject Category Number and the Accession Number.

Accession Number Index: Lists all inventions in order of ascending Accession Number and indicates the related Subject Category Number, the NASA Case Number, the U.S. Patent Application Serial Number, the U.S. Patent Classification Number, and the U.S. Patent Number.

HOW TO USE THIS PUBLICATION TO IDENTIFY NASA INVENTIONS

To identify one or more NASA inventions within a specific technical field or subject, several techniques are possible with the flexibility incorporated into the *NASA PAB*.

(1) *Using Subject Category:* To identify all NASA inventions in any one of the subject categories in this issue of *NASA PAB*, select the desired Subject Category in the Abstract Section (Section 1) and find the inventions abstracted thereunder.

(2) *Using Subject Index:* To identify all NASA inventions listed under a desired technical subject index term, (A) turn to the cumulative Subject Index in the Index Section and find the invention(s) listed under the desired technical subject term. (B) Note the indicated Accession Number and the Subject Category Number. (C) Using the indicated Accession Number, turn to the inside front cover of the Index Section to determine which issue of the Abstract Section includes the Accession Number desired. (D) To find the abstract of the particular invention in the issue of the Abstract Section selected, (1) use the Subject Category Number to locate the Subject Category and (2) use the Accession Number to locate the desired invention within the Subject Category listing.

(3) *Using Patent Classification Index:* To identify all inventions covered by issued NASA patents (not including applications for patent) within a desired Patent Classification, (A) turn to the Patent Classification Number in the Number Index of Section 2 and find the associated invention(s), and (B) follow the instructions outlined in (2)(B), and (D) above.

TYPICAL CITATION AND ABSTRACT

NASA SPONSORED

ACCESSION NUMBER → **N90-17118*** National Aeronautics and Space Administration. ← CORPORATE SOURCE
Pasadena Office, CA.

TITLE → **TAILORABLE INFRARED SENSING DEVICE WITH STRAIN LAYER SUPERLATTICE STRUCTURE Patent**

INVENTOR → LI-JEN CHENG, inventor (to NASA) (California Inst. of Tech., Pasadena.) 27 Jun. 1989 10 p Filed Nov. 25, 1987

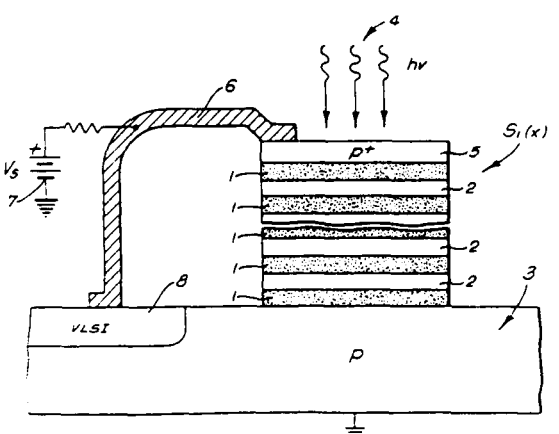
NASA CASE NUMBER → (NASA-CASE-NPO-16617-2-CU; US-PATENT-4,843,439;

US PATENT APPLICATIONS SERIAL NUMBERS → US-PATENT-APPL-SN-125676; US-PATENT-CLASS-357-4; US-PATENT-CLASS-357-30; US-PATENT-CLASS-357-13; US-PATENT-CLASS-357-61) Avail: US Patent and Trademark Office ← AVAILABILITY SOURCE

COSATI CODE → CSCL 14B

An infrared photodetector is formed of a heavily doped p-type Ge(x)Si(1-x)/Si superlattice in which x is pre-established during manufacture in the range 0 to 100 percent. A custom tailored photodetector that can differentiate among close wavelengths in the range of 2.7 to 50 microns is fabricated by appropriate selection of the alloy constituency value, x, to establish a specific wavelength at which photodetection cut-off will occur. ← ABSTRACT

Official Gazette of the U.S. Patent and Trademark Office



← KEY ILLUSTRATION

TABLE OF CONTENTS

Section 1 • Abstracts

GEOSCIENCES

Includes geosciences (general); earth resources and remote sensing; energy production and conversion; environment pollution; geophysics; meteorology and climatology; and oceanography.

For related information see also *Space Sciences.*

42 GEOSCIENCES (GENERAL) N.A.

43 EARTH RESOURCES AND REMOTE SENSING N.A.

Includes remote sensing of earth resources by aircraft and spacecraft; photogrammetry; and aerial photography.

For instrumentation see *35 Instrumentation and Photography.*

44 ENERGY PRODUCTION AND CONVERSION N.A.

Includes specific energy conversion systems, e.g., fuel cells; global sources of energy; geophysical conversion; and windpower.

For related information see also *07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power,* and *28 Propellants and Fuels.*

45 ENVIRONMENT POLLUTION N.A.

Includes atmospheric, noise, thermal, and water pollution.

46 GEOPHYSICS N.A.

Includes aeronomy; upper and lower atmosphere studies; ionospheric and magnetospheric physics; and geomagnetism.

For space radiation see *93 Space Radiation.*

47 METEOROLOGY AND CLIMATOLOGY N.A.

Includes weather forecasting and modification.

48 OCEANOGRAPHY N.A.

Includes biological, dynamic, and physical oceanography; and marine resources.

For related information see also *43 Earth Resources and Remote Sensing.*

LIFE SCIENCES

Includes life sciences (general); aerospace medicine; behavioral sciences; man/system technology and life support; and space biology.

51 LIFE SCIENCES (GENERAL) 20

52 AEROSPACE MEDICINE 21

Includes physiological factors; biological effects of radiation; and effects of weightlessness on man and animals.

53 BEHAVIORAL SCIENCES N.A.

Includes psychological factors; individual and group behavior; crew training and evaluation; and psychiatric research.

54 MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT N.A.

Includes human engineering; biotechnology; and space suits and protective clothing.

For related information see also *16 Space Transportation.*

55 SPACE BIOLOGY N.A.

Includes exobiology; planetary biology; and extraterrestrial life.

MATHEMATICAL AND COMPUTER SCIENCES

Includes mathematical and computer sciences (general); computer operations and hardware; computer programming and software; computer systems; cybernetics; numerical analysis; statistics and probability; systems analysis; and theoretical mathematics.

59 MATHEMATICAL AND COMPUTER SCIENCES (GENERAL) N.A.

60 COMPUTER OPERATIONS AND HARDWARE N.A.

Includes hardware for computer graphics, firmware, and data processing.

For components see *33 Electronics and Electrical Engineering.*

61 COMPUTER PROGRAMMING AND SOFTWARE 21

Includes computer programs, routines, algorithms, and specific applications, e.g., CAD/CAM.

62 COMPUTER SYSTEMS 22

Includes computer networks and special application computer systems.

63 CYBERNETICS N.A.

Includes feedback and control theory, artificial intelligence, robotics and expert systems.

For related information see also *54 Man/System Technology and Life Support.*

64 NUMERICAL ANALYSIS N.A.

Includes iteration, difference equations, and numerical approximation.

65 STATISTICS AND PROBABILITY N.A.

Includes data sampling and smoothing; Monte Carlo method; and stochastic processes.

66 SYSTEMS ANALYSIS N.A.

Includes mathematical modeling; network analysis; and operations research.

67 THEORETICAL MATHEMATICS N.A.

Includes topology and number theory.

PHYSICS

Includes physics (general); acoustics; atomic and molecular physics; nuclear and high-energy physics; optics; plasma physics; solid-state physics; and thermodynamics and statistical physics.

For related information see also *Engineering.*

70 PHYSICS (GENERAL) 23

For precision time and time interval (PTTI) see *35 Instrumentation and Photography;* for geophysics, astrophysics or solar physics see *46 Geophysics, 90 Astrophysics,* or *92 Solar Physics.*

Note: N.A. means that no abstracts were assigned to this category for this issue.

Section 2 • Indexes

JUNE 1990 (Supplement 37)

NASA Patent Abstracts Bibliography

A Semiannual Publication of the National Aeronautics and Space Administration

04

AIRCRAFT COMMUNICATIONS AND NAVIGATION

Includes digital and voice communication with aircraft; air navigation systems (satellite and ground based); and air traffic control.

N90-18379*# National Aeronautics and Space Administration. Pasadena Office, CA.
EFFICIENT DETECTION AND SIGNAL PARAMETER ESTIMATION WITH APPLICATION TO HIGH DYNAMIC GPS RECEIVER Patent Application
RAJENDRA KUMAR, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 31 Oct. 1989 45 p (Contract NAS7-918)
(NASA-CASE-NPO-17820-1-CU; US-PATENT-APPL-SN-429734; NAS 1.71:NPO-17820-1-CU) Avail: NTIS HC A03/MF A01 CSCL 17G

In a system for deriving position, velocity, and acceleration information from a received signal emitted from an object to be tracked wherein the signal comprises a carrier signal phase modulated by unknown binary data and experiencing very high Doppler and Doppler rate, this invention provides combined estimation/detection apparatus for simultaneously detecting data bits and obtaining estimates of signal parameters such as carrier phase and frequency related to receiver dynamics in a sequential manner. There is a first stage for obtaining estimates of the signal parameters related to phase and frequency in the vicinity of possible data transitions on the basis of measurements obtained within a current data bit. A second stage uses the estimates from the first stage to decide whether or not a data transition has actually occurred. There is a third stage for removing data modulation from the received signal when a data transition has occurred and a fourth stage for using the received signal with data modulation removed therefrom to update global parameters which are dependent only upon receiver dynamics and independent of data modulation. Finally, there is a fifth stage for using the global parameters to determine the position, velocity, and acceleration of the object.

NASA

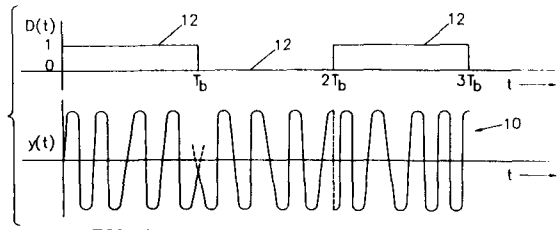


FIG. 1

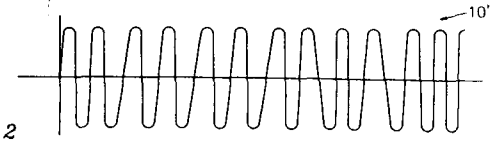


FIG. 2

05

AIRCRAFT DESIGN, TESTING AND PERFORMANCE

Includes aircraft simulation technology.

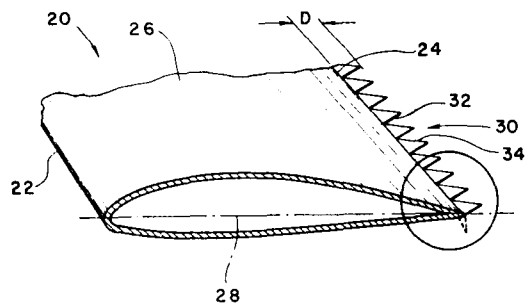
N90-15094*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
SERRATED TRAILING EDGES FOR IMPROVING LIFT AND DRAG CHARACTERISTICS OF LIFTING SURFACES Patent Application
PAUL M. H. W. VIJGEN, inventor (to NASA) (Kansas Univ., Lawrence.), FLOYD G. HOWARD, inventor (to NASA), DENNIS M. BUSHNELL, inventor (to NASA), and BRUCE J. HOLMES, inventor (to NASA) 30 Nov. 1989 16 p Sponsored by NASA
(NASA-CASE-LAR-13870-1; US-PATENT-APPL-SN-429516; NAS 1.71:LAR-13870-1) Avail: NTIS HC A03/MF A01 CSCL 01C

An improvement in the lift and drag characteristics of a lifting surface is achieved by attaching a serrated panel to the trailing edge of the lifting surface. The serrations may have a saw-tooth configuration, with a 60 degree included angle between adjacent serrations. The serrations may vary in shape and size over the span-wise length of the lifting surface, and may be positioned at fixed or adjustable deflections relative to the chord of the lifting surface.

NASA

FIG. 1
(PRIOR ART)

FIG. 2



09

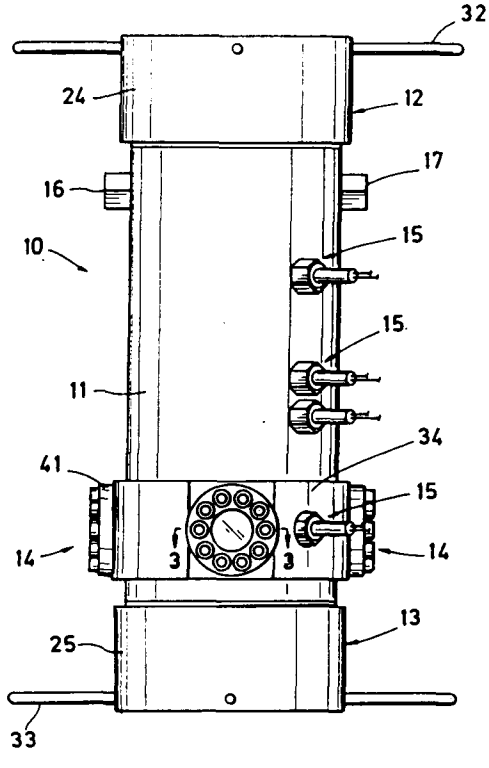
RESEARCH AND SUPPORT FACILITIES (AIR)

Includes airports, hangars and runways; aircraft repair and overhaul facilities; wind tunnels; shock tubes; and aircraft engine test stands.

N90-16771*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
HIGH-PRESSURE PROMOTED COMBUSTION CHAMBER Patent Application
MICHELLE A. RUCKER, inventor (to NASA) and JOEL M. STOLTZFUS, inventor (to NASA) 18 Jul. 1989 19 p (NASA-CASE-MSC-21470-1; US-PATENT-APPL-SN-381239; NAS 1.71:MSC-21470-1) Avail: NTIS HC A03/MF A01 CSCL 14B

In the preferred embodiment of the promoted combusiton chamber disclosed herein, a thick-walled tubular body that is capable of withstanding extreme pressures is arranged with removable upper and lower end closures to provide access to the chamber for dependently supporting a test sample of a material being evaluated in the chamber. To facilitate the real-time analysis of a test sample, several pressure-tight viewing ports capable of withstanding the simulated environmental conditions are arranged in the walls of the tubular body for observing the test sample during the course of the test. A replaceable heat-resistant tubular member and replaceable flame-resistant internal liners are arranged to be fitted inside of the chamber for protecting the interior wall surfaces of the combustion chamber during the evaluation tests. Inlet and outlet ports are provided for admitting high-pressure gases into the chamber as needed for performing dynamic analyses of the test sample during the course of an evaluation test.

NASA



16

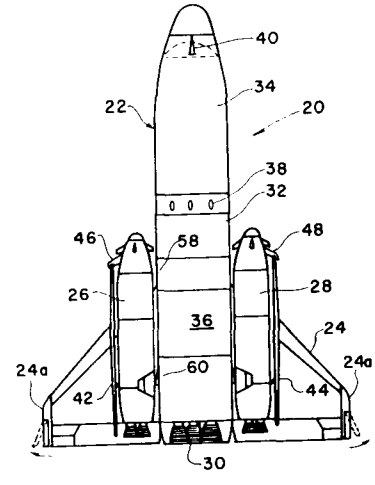
SPACE TRANSPORTATION

Includes passenger and cargo space transportation, e.g., shuttle operations; and space rescue techniques.

N90-16781*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
A TWO-STAGE EARTH-TO-ORBIT TRANSPORT WITH TRANSLATING OBLIQUE WINGS FOR BOOSTER RECOVERY Patent Application
IAN O. MACCONOCHIE, inventor (to NASA) and CHARLES A. BREINER, inventor (to NASA) (PRC Kentron, Inc., Hampton, VA.) 9 Nov. 1989 13 p Sponsored by NASA (NASA-CASE-LAR-14156-1; US-PATENT-APPL-SN-433804; NAS 1.71:LAR-14156-1) Avail: NTIS HC A03/MF A01 CSCL 22B

A two-stage earth-to-orbit transport is disclosed which includes an orbiter vehicle and a pair of boosters, each having a deployable oblique wing located along a longitudinal axis of the booster. The wing is deployed in an oblique disposition in supersonic and hypersonic speeds, and disposed at 90 degree for subsonic speeds encountered during entry. The oblique wing is driven axially and rotated by means of a turret mounted on rails.

NASA



18

SPACECRAFT DESIGN, TESTING AND PERFORMANCE

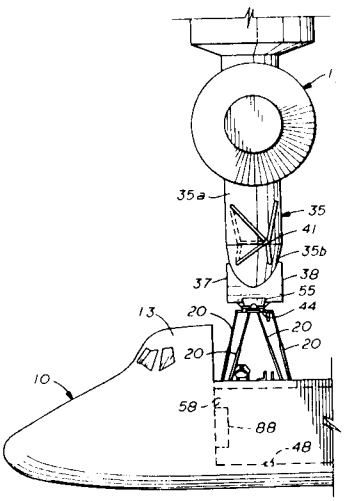
Includes satellites; space platforms; space stations; spacecraft systems and components such as thermal and environmental controls; and attitude controls.

N90-11798*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
DOCKING SYSTEM FOR SPACECRAFT Patent Application
JON B. KAHN, inventor (to NASA) 30 Dec. 1988 21 p (NASA-CASE-MSC-21327-1; NAS 1.71:MSC-21327-1; US-PATENT-APPL-SN-292121) Avail: NTIS HC A03/MF A01 CSCL 22B

A mechanism is disclosed for the docking of a spacecraft to a space station where a connection for transfer of personnel and equipment is desired. The invention comprises an active docking

structure on a spacecraft and a passive docking structure on the station. The passive structure includes a docking ring mounted on a tunnel structure fixed to the space station. The active structure includes a docking ring carried by an actuator-attenuator devices, each attached at one end to the ring and at its other end in the spacecraft payload bay. The devices respond to command signals for moving the docking ring between a stowed position in the spacecraft to a deployed position suitable for engagement with the docking ring. The devices comprise means responsive to signals of sensed loadings to absorb impact energy and retraction means for drawing the coupled spacecraft and station into final docked configuration and moving the tunnel structure to a berthed position in the spacecraft. Latches couple the spacecraft and space station upon contact of the docking rings and latches establish a structural tie between the spacecraft when retracted.

NASA



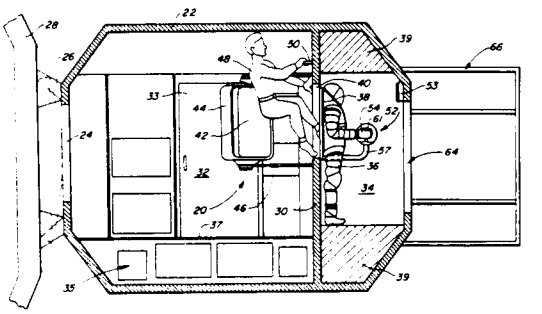
N90-16860* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.

SUITPORT EXTRA-VEHICULAR ACCESS FACILITY Patent

MARC M. COHEN, inventor (to NASA) 27 Jun. 1989 19 p Filed Oct. 20, 1987
(NASA-CASE-ARC-11635-1; US-PATENT-4,842,224; US-PATENT-APPL-SN-110388; US-PATENT-CLASS-244-159; US-PATENT-CLASS-2-2.1A) Avail: US Patent and Trademark Office CSCL 22B

In a system for entering and leaving a space station, a bulkhead divides the module into an antechamber and an airlock. A space suit has a portable life support system (PLSS) interface on its back. The suit is removably attached to the bulkhead by the interface at a hatch in the bulkhead. A PLSS is detachably mounted in the hatch cover, which is pivotally mounted to move away from the hatch to allow an astronaut to enter the suit through the open hatch and the PLSS interface. After entering the suit, the astronaut closes the hatch and attaches the PLSS to the suit by the operating control to which the glove portion of the suit is attached. The astronaut initiates pumpdown of the airlock with the control. When the pumpdown is complete, the astronaut opens the hatch, disconnects the PLSS from the hatch cover, pivots the pressure vessels of the control to one side on their supports, disconnects the glove portions from the pressure vessels and goes EVA.

Official Gazette of the U.S. Patent and Trademark Office



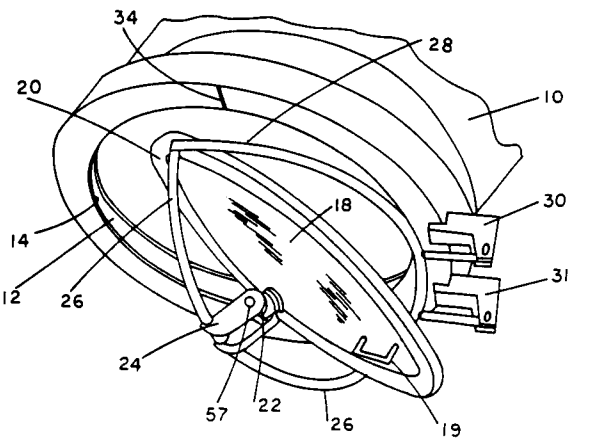
N90-19278* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.

HATCH COVER Patent

CHARLES S. ALLTON, inventor (to NASA) and JAMES H. OKANE, inventor (to NASA) 27 Jun. 1989 8 p Filed 9 Mar. 1988
(NASA-CASE-MSC-21356-1; US-PATENT-4,842,223; US-PATENT-APPL-SN-165956; US-PATENT-CLASS-244-158R; US-PATENT-CLASS-49-253; US-PATENT-CLASS-114-112; US-PATENT-CLASS-114-201R; US-PATENT-CLASS-244-129.5) Avail: US Patent and Trademark Office CSCL 22B

This invention relates to a hatch and more particularly to a hatch for a space vehicle where the hatch has a low volume sweep and can be easily manipulated from either side of the hatch. The hatch system includes an elliptical opening in a bulkhead and an elliptical hatch member. The hatch cover system includes an elliptical port opening in a housing and an elliptical cover member supported centrally by a rotational bearing for rotation about a rotational axis normal to the cover member and by pivot pins in a gimbal member for pivotal movement about axes perpendicular to the rotational axis. Arm members support the gimbal member pivotally by pivot members so that upon rotation and manipulation the cover member can be articulatedly moved from a closed position to the port opening to an out of the way position with a minimum of volume sweep by the cover member.

Official Gazette of the U.S. Patent and Trademark Office



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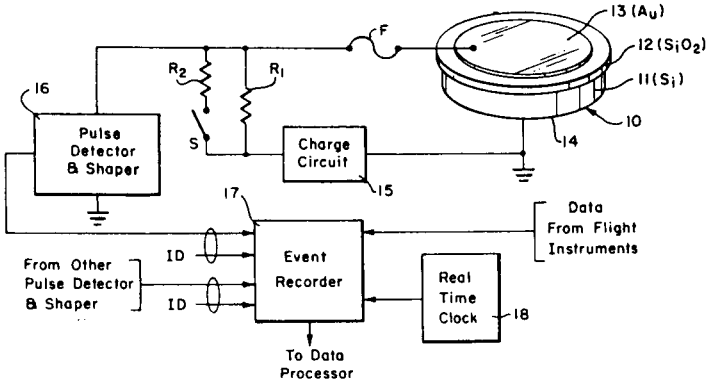
SPACECRAFT INSTRUMENTATION

N90-10132*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
METHOD AND APPARATUS FOR DETERMINING TIME, DIRECTION AND COMPOSITION OF IMPACTING SPACE PARTICLES Patent Application
WILLIAM H. KINARD, inventor (to NASA), JIM J. WORTMAN, inventor (to NASA), PHILIP C. KASSEL, JR., inventor (to NASA), FRED S. SINGER, inventor (to NASA), DONALD H. HUMES, inventor (to NASA), and JOHN E. STANLEY, inventor (to NASA) (Virginia Univ., Charlottesville.) 21 Jun. 1989 19 p
(NASA-CASE-LAR-13392-1-CU; NAS 1.71:LAR-13392-1-CU; US-PATENT-APPL-SN-369490) Avail: NTIS HC A03/MF A01 CSCL 14B

A space particle collector for recording the time specific particles are captured, and its direction at the time of capture, utilizes an array of targets, each comprised of an MOS capacitor on a chip charges from an external source and discharged upon impact by a particle through a tab on the chip that serves as a fuse. Any impacting particle creates a crater, but only the first will cause a discharge of the capacitor. A substantial part of the metal film around the first crater is burned off by the discharge current. The time of the impulse which burns the tab, and the identification of the target, is recorded together with data from flight instruments. The metal film is partitioned into pie sections to provide a plurality of targets on each of an array of silicon wafers, thus increasing the total number of identified particles that can be collected. It is thus certain which particles were captured at what specific times.

NASA



N90-15130*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
EXTENDED TEMPERATURE RANGE ROCKET INJECTOR Patent Application
STEVEN J. SCHNEIDER, inventor (to NASA) 30 Nov. 1989 9 p
(NASA-CASE-LEW-14846-1; NAS 1.71:LEW-14846-1; US-PATENT-APPL-SN-443523) Avail: NTIS HC A02/MF A01 CSCL 21H

A rocket injector is provided with multiple sets of manifolds for supplying propellants to injector elements. Sensors transmit the temperatures of the propellants to a suitable controller which is operably connnected to valves between these manifolds and propellant storage tanks. When cryogenic propellant temperatures are sensed only a portion of the valves are opened to furnish propellants to some of the manifolds. When lower temperatures are sensed additional valves are opened to furnish propellants to more of the manifolds.

NASA

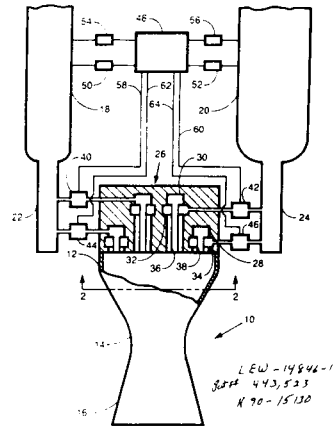


Fig. 1

20

SPACECRAFT PROPULSION AND POWER

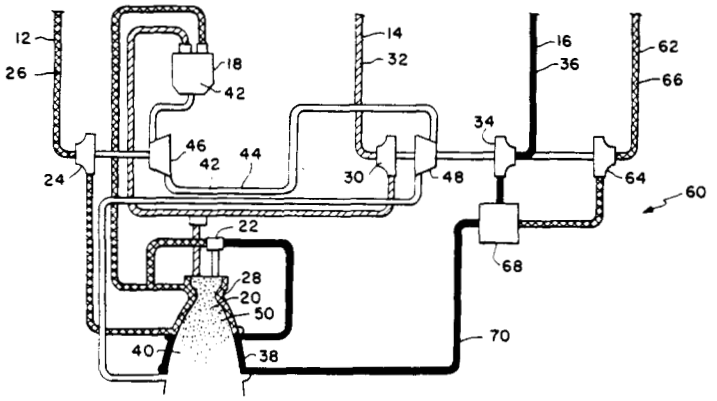
Includes main propulsion systems and components, e.g., rocket engines; and spacecraft auxiliary power sources.

N90-19298* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
DUAL-FUEL, DUAL-MODE ROCKET ENGINE Patent
JAMES A. MARTIN, inventor (to NASA) 23 May 1989 9 p Filed 9 Mar. 1988
(NASA-CASE-LAR-13773-1; US-PATENT-4,831,818; US-PATENT-APPL-SN-165946; US-PATENT-CLASS-60-204; US-PATENT-CLASS-60-259; US-PATENT-CLASS-60-260) Avail: US Patent and Trademark Office CSCL 21H

The invention relates to a dual fuel, dual mode rocket engine designed to improve the performance of earth-to-orbit vehicles. For any vehicle that operates from the earth's surface to earth orbit, it is advantageous to use two different fuels during its ascent. A high density impulse fuel, such as kerosene, is most efficient during the first half of the trajectory. A high specific impulse fuel, such as hydrogen, is most efficient during the second half of the trajectory. The invention allows both fuels to be used with a single rocket engine. It does so by adding a minimum number of state-of-the-art components to baseline single made rocket engines, and is therefore relatively easy to develop for near term applications. The novelty of this invention resides in the mixing of

fuels before exhaust nozzle cooling. This allows all of the engine fuel to cool the exhaust nozzle, and allows the ratio of fuels used throughout the flight depend solely on performance requirements, not cooling requirements.

Official Gazette of the U.S. Patent and Trademark Office



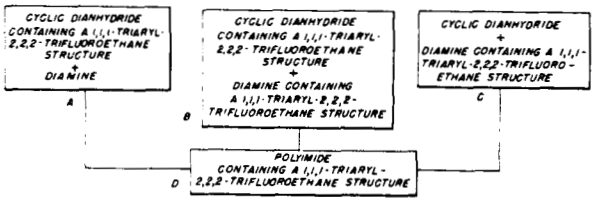
23

CHEMISTRY AND MATERIALS (GENERAL)

N90-19300* National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
NEW CONDENSATION POLYIMIDES CONTAINING 1,1,1-TRIARYL-2,2,2-TRIFLUOROETHANE STRUCTURES
Patent
WILLIAM B. ALSTON, inventor (to NASA) and ROY F. GRATZ, inventor (to NASA) 4 Jul. 1989 18 p Filed 29 Oct. 1986
(NASA-CASE-LEW-14346-1; US-PATENT-4,845,167; US-PATENT-APPL-SN-924470; US-PATENT-CLASS-528-353; US-PATENT-CLASS-528-352; US-PATENT-CLASS-528-229; US-PATENT-CLASS-528-188) Avail: US Patent and Trademark Office CSCL 07A

The invention relates to a condensation polyimide containing a 1,1,1-triaryl 2,2,2-trifluoroethane structure and other related condensation polyimides. The process for their preparation, which comprises polymerization of a cyclic dianhydride with a diamine is also covered.

Official Gazette of the U.S. Patent and Trademark Office



24

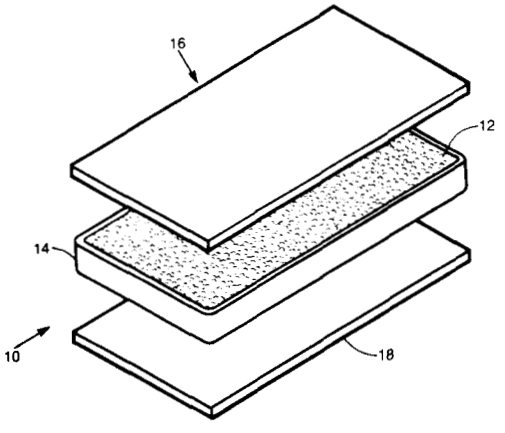
COMPOSITE MATERIALS

Includes physical, chemical, and mechanical properties of laminates and other composite materials.

N90-15147*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
IMPROVED PROCESS FOR HIP CANNING OF COMPOSITES
Patent Application
JOHN J. JUHAS, inventor (to NASA) 9 Nov. 1989 11 p Sponsored by NASA
(NASA-CASE-LEW-14990-1-CU; US-PATENT-APPL-SN-433863; NAS 1.71:LEW-14990-1-CU) Avail: NTIS HC A03/MF A01 CSCL 11D

A single step is relied on in the canning process for hot isostatic pressing (HIP) metallurgy composites. The composites are made from arc-sprayed and plasma sprayed monotape. The HIP can is of compatible refractory metal and is sealed at high vacuum and temperature. This eliminates outgassing during hot isostatic pressing.

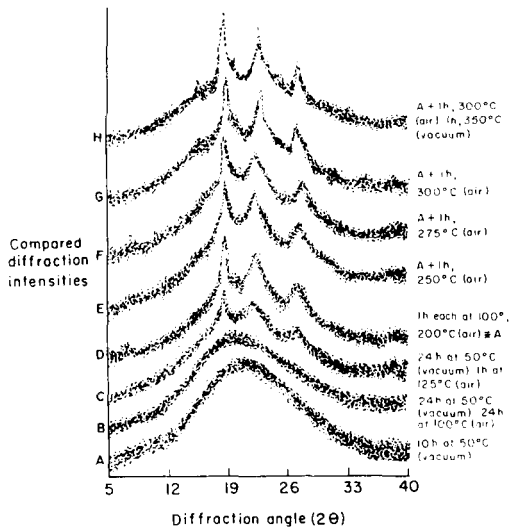
NASA



N90-15148*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
NOVEL POLYIMIDE COMPOSITIONS BASED ON 4,4': ISOPHTHALOYLDIPHTHALIC ANAYDRIDE (IDPA) Patent Application
J. RICHARD PRATT, inventor (to NASA) (PRC Kentron, Inc., Hampton, VA.) and TERRY L. SAINTCLAIR, inventor (to NASA) 28 Apr. 1989 25 p
(NASA-CASE-LAR-14194-1; NAS 1.71:LAR-14194-1; US-PATENT-APPL-SN-344877) Avail: NTIS HC A03/MF A01 CSCL 11D

A series of twelve high temperature, high performance polyimide compositions based on 4,4'-isophthaloyl diphthalic anhydride (IDPA) was prepared and characterized. Tough, film-forming, organic solvent-insoluble polyimides were obtained. Three materials were semicrystalline. Several gave excellent long-term thermooxidative stability by isothermal thermogravimetric analysis (ITGA) at 300 C and 350 C in air when compared to Kapton H film (duPont). One extensively studied material displayed different levels of semicrystallinity over a wide range of final cure time/temperatures. The polyimide from IDPA and 1,3-bis (4-aminophenoxy 4'-benzoyl) benzene exhibited multiple crystallization and melting behavior, implying the existence of two kinetic and two thermodynamic crystallization and melting transitions by differential scanning calorimetry (DSC).

NASA



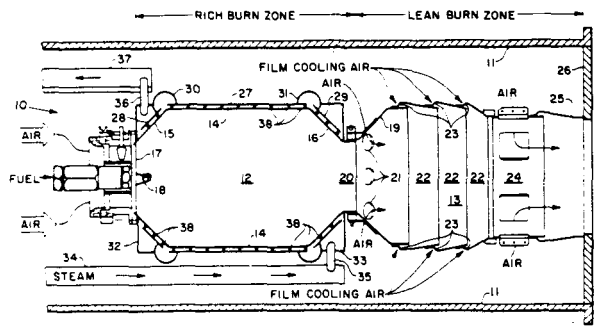
A catalyst is disclosed for the combination of CO and O2 to form CO2, which includes a platinum group metal (e.g., platinum); a reducable metal oxide having multiple valence states (e.g., SNO2); and a compound which can bind water to its structure (e.g., silica gel). This catalyst is ideally suited for application to high-powered pulsed, CO2 lasers operating in a sealed for closed-cycle condition

NASA

N90-11824* National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
STEAM COOLED RICH-BURN COMBUSTOR LINER Patent
DONALD F. SCHULTZ, inventor (to NASA) 11 Apr. 1989 7 p Filed 23 Dec. 1982 Supersedes N83-17628 (21 - 8, p 1149)
(NASA-CASE-LEW-13609-1; US-PATENT-4,819,438; US-PATENT-APPL-SN-452465; US-PATENT-CLASS-60-730; US-PATENT-CLASS-60-732; US-PATENT-CLASS-165-83; US-PATENT-CLASS-165-81; US-PATENT-CLASS-165-156; US-PATENT-CLASS-431-352) Avail: US Patent and Trademark Office CSCL 21B

Stress on the wall of the primary combustor is minimized. Thus, the steam pressure in the inlet manifold is approximately the same as the combustor discharge pressure at the throat, and annular expansion tubes minimize stresses in the jacket. The second combustor accomplishes lean burning of the gases discharged from primary combustor. The combination of the rich burning of heavy fuels followed by lean burning minimizes the NOx in the exhaust gas discharged from combustor. The novelty of the invention appears to lie in cooling a rich burn combustor with spiral streams of saturated steam flowing between the combustor linear and the jacket at a predetermined pressure; the jacket including stress relief means.

Official Gazette of the U.S. Patent and Trademark Office



25

INORGANIC AND PHYSICAL CHEMISTRY

Includes chemical analysis, e.g., chromatography; combustion theory; electrochemistry; and photochemistry.

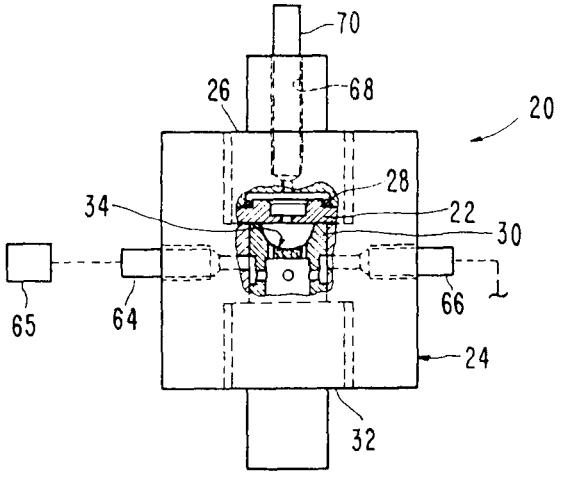
N90-11823*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
CATALYST FOR CARBON MONOXIDE OXIDATION Patent Application
BILLY T. UPCHURCH, inventor (to NASA), IRVIN M. MILLER, inventor (to NASA), DAVID R. BROWN, inventor (to NASA), PATRICIA P. DAVIS, inventor (to NASA), DAVID R. SCHRYER, inventor (to NASA), KENNETH G. BROWN, inventor (to NASA), and JOHN D. VANNORMAN, inventor (to NASA) (Old Dominion Univ., Norfolk, VA.) 18 Jan. 1989 11 p
(NASA-CASE-LAR-14155-1-SB; NAS 1.71:LAR-14155-1-SB; US-PATENT-APPL-SN-298150) Avail: NTIS HC A03/MF A01 CSCL 07D

N90-15161*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
IGNITABILITY TEST METHOD AND APPARATUS Patent Application
LAURENCE J. BEMENT, inventor (to NASA), JAMES W. BAILEY, inventor (to NASA), and MORRY L. SCHIMMEL, inventor (to NASA) (Schimmel Co., Saint Louis, MO.) 25 Oct. 1989 26 p
(NASA-CASE-LAR-13996-1-SB; NAS 1.71:LAR-13996-1-SB; US-PATENT-APPL-SN-426345) Avail: NTIS HC A03/MF A01 CSCL 21B

An apparatus for testing ignitability of an initiator includes a body with a central cavity, initiator holder for holding the initiator over the central cavity of the body, an ignition material holder disposed in the central cavity of the body and a cavity facing the initiator holder which receives a measured quantity of ignition material to be ignited by the initiator and a chamber in communication with the cavity of the ignition material holder and the central cavity of the body. A measuring system for analyzing pressure characteristics is generated by ignition material by the initiator. The measuring system includes at least one transducer

coupled to an oscillograph for recording pressure traces generated by ignition.

NASA



N90-16887*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
MICROPOROUS STRUCTURE WITH LAYERED INTERSTITIAL SURFACE TREATMENT, AND METHOD AND APPARATUS FOR PREPARATION THEREOF Patent Application
STEVEN L. KOONTZ, inventor (to NASA) 31 Oct. 1989 24 p
(NASA-CASE-MSC-21487-1; NAS 1.71:MSC-21487-1;
US-PATENT-APPL-SN-429739) Avail: NTIS HC A03/MF A01
CSCL 07D

A microporous structure with layered interstitial surface treatments, and the method and apparatus for its preparation are disclosed. The structure is prepared by sequentially subjecting a uniformly surface treated structure to atomic oxygen treatment to remove an outer layer of surface treatment to a generally uniform depth, and then surface treating the so exposed layer with another surface treating agent. The atomic oxygen/surface treatment steps may optionally be repeated, each successive time to a lesser depth, to produce a microporous structure having multilayered surface treatments. The apparatus employs at least one side arm from a main oxygen-containing chamber. The side arm has characteristic relaxation times such that a uniform atomic oxygen dose rate is delivered to a specimen positioned transversely in the side arm spaced from the main gas chamber.

NASA

FIG. 3

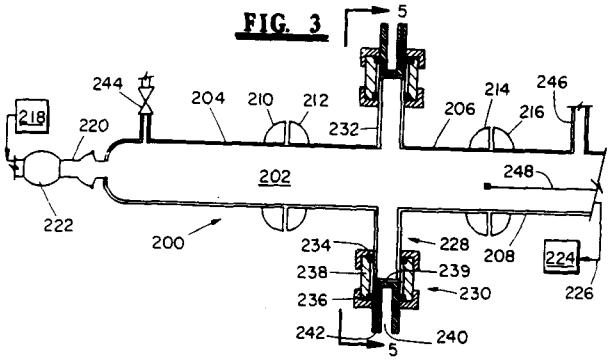


FIG. 4

26

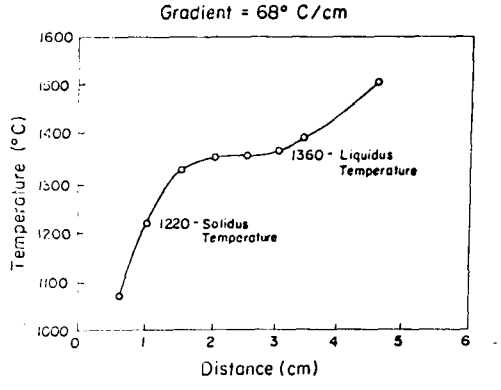
METALLIC MATERIALS

Includes physical, chemical, and mechanical properties of metals, e.g., corrosion; and metallurgy.

N90-15227*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.
DIRECTIONAL SOLIDIFICATION OF SUPERALLOYS Patent Application
DEBORAH DIANE SCHMIDT, inventor (to NASA), WENDY SUE ALTER, inventor (to NASA), and WILLIAM DAVID HAMILTON, inventor (to NASA) 7 Sep. 1989 13 p
(NASA-CASE-MFS-28314-1; NAS 1.71:MFS-28314-1;
US-PATENT-APPL-SN-404289) Avail: NTIS HC A03/MF A01
CSCL 11F

This invention relates to the directional solidification of superalloys, in particular nickel-based superalloys, by imposition of a predetermined temperature profile in the solidification front and, depending on the desired results, a predetermined rate of advance of said solidification front, whereas castings of markedly superior fatigue resistance are produced.

NASA



27

NONMETALLIC MATERIALS

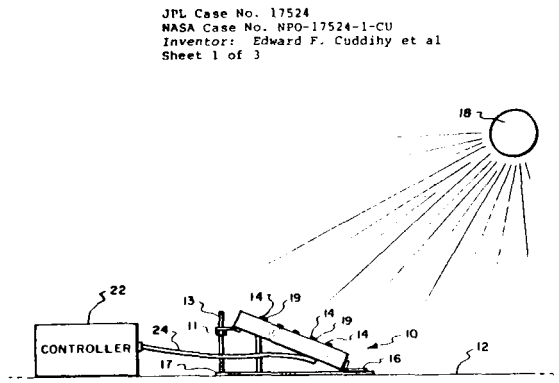
Includes physical, chemical, and mechanical properties of plastics, elastomers, lubricants, polymers, textiles, adhesives, and ceramic materials.

N90-10261*# National Aeronautics and Space Administration. Pasadena Office, CA.
PREDICTIVE AGING OF POLYMERS Patent Application
EDWARD F. CUDDIHY, inventor (to NASA) and PAUL B. WILLIS, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 16 Jun. 1989 15 p Prepared in cooperation with Jet Propulsion Lab., California Inst. of Tech., Pasadena
(Contract NAS7-918)
(NASA-CASE-NPO-17524-1-CU; NAS 1.71:NPO-17524-1-CU;
US-PATENT-APPL-SN-366957) Avail: NTIS HC A03/MF A01
CSCL 11C

A method of predicting aging of polymers operates by heating a polymer in the outdoors to an elevated temperature until a change of property is induced. The test is conducted at a plurality of temperatures to establish a linear Arrhenius plot which is extrapolated to predict the induction period for failure of the polymer at ambient temperature. An Outdoor Photo Thermal Aging Reactor (OPTAR) is also described including a heatable platen for receiving a sheet of polymer, means to heat the platen, and switching means

such as a photoelectric switch for turning off the heater during dark periods.

NASA



N90-15259*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

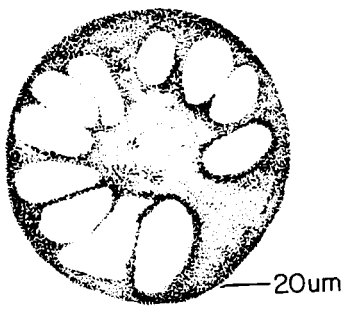
WET SPINNING OF SOLID POLYAMIC ACID FIBERS Patent Application

WILLIAM E. DOROGY, JR., inventor (to NASA) (PRC Kentron, Inc., Hampton, VA.) and ANNE K. SAINTCLAIR, inventor (to NASA) 21 Sep. 1989 21 p

(NASA-CASE-LAR-14162-1; NAS 1.71:LAR-14162-1; US-PATENT-APPL-SN-410572) Avail: NTIS HC A03/MF A01 CSCL 11C

The invention is a process for the production of solid aromatic polyamic acid and polyimide fibers from a wet gel or coagulation bath wet gel using N,N-dimethylacetamide (DMAc) solution of the polyamic acid derived from aromatic dianhydrides such as 3,3',4,4'-benzo phenone tetracarboxylic dianhydride (BTDA) and aromatic diamines such as 4,4'oxydianiline (4,4'-ODA). By utilizing the interrelationship between coagulation medium and concentration, resin inherent viscosity, resin percent solids, filament diameter, and fiber void content, it is possible to make improved polyamic acid fibers. Solid polyimide fibers, obtained by the thermal cyclization of the polyamic acid precursor, have increased tensile properties compared to fibers containing macropores from the same resin system.

NASA



N90-15260*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

POLYIMIDES WITH CARBONYL AND ETHER CONNECTING GROUPS BETWEEN THE AROMATIC RINGS Patent Application

PAUL M. HERGENROTHER, inventor (to NASA) and STEPHEN J. HAVENS, inventor (to NASA) (PRC Kentron, Inc., Hampton, VA.) 9 Nov. 1989 24 p

(NASA-CASE-LAR-14001-1; NAS 1.71:LAR-14001-1; US-PATENT-APPL-SN-433812) Avail: NTIS HC A03/MF A01 CSCL 11C

New polyimides have been prepared from the reaction of aromatic dianhydrides with novel aromatic diamines containing carbonyl and ether connecting groups between the aromatic rings. Several of these polyimides are shown to be semi-crystalline as evidenced by wide angle x ray diffraction and differential scanning calorimetry. Most of the polyimides form tough solvent resistant films with high tensile properties. Several of these materials can be thermally processed to form solvent and base resistant moldings.

NASA

N90-15261*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.

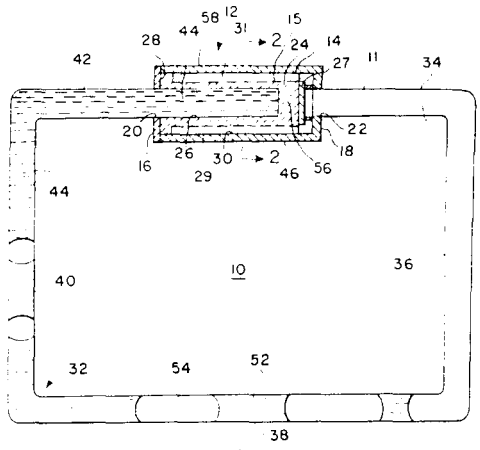
CERAMIC HEAT PIPE WICK Patent Application

BENJAMIN SEIDENBERG, inventor (to NASA) and THEODORE SWANSON, inventor (to NASA) 31 Jan. 1989 18 p

(NASA-CASE-GSC-13199-1; US-PATENT-APPL-SN-304147; NAS 1.71:GSC-13199-1) Avail: NTIS HC A03/MF A01 CSCL 11C

A wick for use in a capillary loop pump heat pipe is disclosed. The wick material is an essentially uniformly porous, permeable, open-cell, silicon dioxide/aluminum oxide inorganic ceramic foam having a silica fiber ratio, by weight, of about 78 to 22, respectively, a density of 6 lbs/cu ft, and an average pore size of less than 5 microns. A representative material having these characteristics is Lockheed Missile and Space Company, Inc.'s HTP 6-22. This material is fully compatible with the freons and anhydrous ammonia and allows for the use of these very efficient working fluids, and others, in capillary loops.

NASA



N90-15262*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

BROMINATED GRAPHITIZED CARBON FIBERS Patent Application

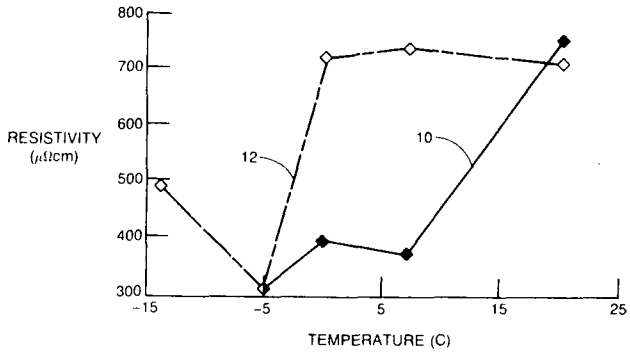
CHING-CHEN HUNG, inventor (to NASA) 30 Nov. 1989 13 p

(NASA-CASE-LEW-14698-2; NAS 1.71:LEW-14698-2; US-PATENT-APPL-SN-443289) Avail: NTIS HC A03/MF A01 CSCL 11C

Low cost, high break elongation graphitized carbon fibers having low degree of graphitization are inert to bromine at room or higher temperatures, but are brominated at -7 to 20 C, and then debrominated at ambient. Repetition of this bromination-debromination process can bring the bromine content to 18 percent. Electrical conductivity of the brominated fibers is

three times of the before-bromination value.

NASA



N90-15263*# National Aeronautics and Space Administration. Pasadena Office, CA.
MOLECULES WITH ENHANCED ELECTRONIC POLARIZABILITIES BASED ON DEFECT-LIKE STATES IN CONJUGATED POLYMERS Patent Application
DAVID N. BERATAN, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 10 Oct. 1989 22 p
(Contract NAS7-918)
(NASA-CASE-NPO-17633-1-CU; NAS 1.71:NPO-17633-1-CU; US-PATENT-APPL-SN-418611) Avail: NTIS HC A03/MF A01 CSCL 11C

Highly conjugated organic polymers typically have large non-resonant electronic susceptibilities, which give the molecules unusual optical properties. To enhance these properties, defects are introduced into the polymer chain. Examples include light doping of the conjugated polymer and synthesis, conjugated polymers which incorporate either electron donating or accepting groups, and conjugated polymers which contains a photoexcitable species capable of reversibly transferring its electron to an acceptor. Such defects in the chain permit enhancement of the second hyperpolarizability by at least an order of magnitude.

NASA

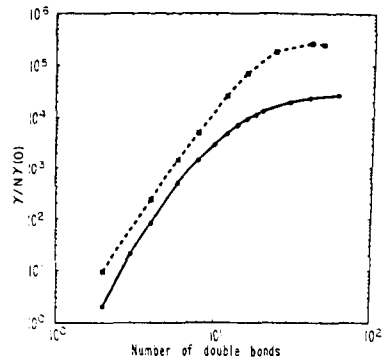
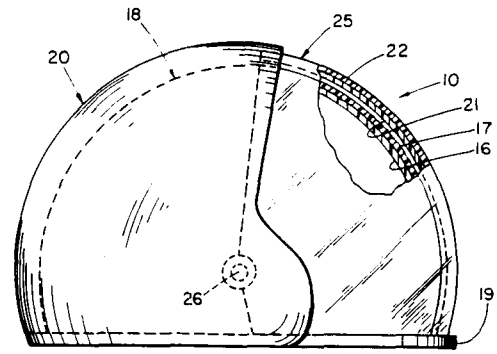


Fig. 1.

N90-16925*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
POLYCARBONATE ARTICLE WITH CHEMICAL RESISTANT COATING Patent Application
JOSEPH J. KOSMO, inventor (to NASA) and FREDERIC S. DAWN, inventor (to NASA) 30 Nov. 1989 10 p
(NASA-CASE-MSC-21503-1; NAS 1.71:MSC-21503-1; US-PATENT-APPL-SN-443414) Avail: NTIS HC A02/MF A01 CSCL 11C

An article of laminate construction is disclosed which is comprised of an underlayer of polycarbonate polymer material to which is applied a chemically resistant outer layer of polysulfone. The layers which are joined by compression-heat molding, are molded to form the shape of a body protective shell such as a space helmet comprising a shell of polycarbonate, polysulfone laminate construction attached at its open end to a sealing ring adapted for connection to a space suit. The front portion of the shell provides a transparent visor for the helmet. An outer visor of polycarbonate polysulfone laminate construction is pivotally mounted to the sealing ring for covering the transparent visor portion of the shell during extravehicular activities. The polycarbonate under layer of the outer visor is coated on its inner surface with a vacuum deposit of gold to provide additional thermal radiation resistance.

NASA



N90-16949* National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
CELLULAR THERMOSETTING FLUORODIEPOXIDE POLYMERS Patent
SHENG Y. LEE, inventor (to NASA) 27 Jun. 1989 5 p Filed Mar. 4, 1988
(NASA-CASE-GSC-13008-2; US-PATENT-4,843,123; US-PATENT-APPL-SN-163928; US-PATENT-CLASS-521-178; US-PATENT-CLASS-521-82; US-PATENT-CLASS-521-97; US-PATENT-CLASS-521-98; US-PATENT-CLASS-521-145; US-PATENT-CLASS-521-189) Avail: US Patent and Trademark Office CSCL 11C

Thermosetting fluoropolymer foams are made by mixing fluid form thermosetting fluoropolymer components having a substantial fluorine content, placing the mixture in a pressure tight chamber, filling the chamber with a gas, at relatively low pressure, that is unreactive with the fluoropolymer components, allowing the mixture to gel, removing the gelled fluoropolymer from the chamber and thereafter heating the fluoropolymer at a relatively low temperature to simultaneously sure and foam the fluoropolymer. The resulting fluoropolymer product is closed celled with the cells storing the gas employed for foaming. The fluoropolymer resins employed may be any thermosetting fluoropolymer including fluoroepoxies, fluoropolyurethanes and fluoroacrylates.

Official Gazette of the U.S. Patent and Trademark Office

N90-16950* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
COPOLYIMIDE WITH A COMBINATION OF FLEXIBILIZING GROUPS Patent
TERRY L. STCLAIR, inventor (to NASA), HAROLD D. BURKS, inventor (to NASA), and DONALD J. PROGAR, inventor (to NASA) 6 Jun. 1989 11 p Filed Jul. 9, 1987
(NASA-CASE-LAR-13821-1; US-PATENT-4,837,300; US-PATENT-APPL-SN-071686; US-PATENT-CLASS-528-353; US-PATENT-CLASS-524-233; US-PATENT-CLASS-524-366; US-PATENT-CLASS-524-378; US-PATENT-CLASS-524-600; US-PATENT-CLASS-524-607; US-PATENT-CLASS-528-125)
Avail: US Patent and Trademark Office CSCL 11C

Copolyimides are prepared by reacting one or more aromatic dianhydrides with a meta-substituted phenylene diamine and an aromatic bridged diamine. The incorporation of meta-substituted phenylene diamine derived units and bridged aromatice diamine

derived units into the linear aromatic polymer backbone results in a copolyimide of improved flexibility, processability, and melt-flow characteristics. The copolyimides are especially useful as thermoplastic hot-melt adhesives.

Official Gazette of the U.S. Patent and Trademark Office

31

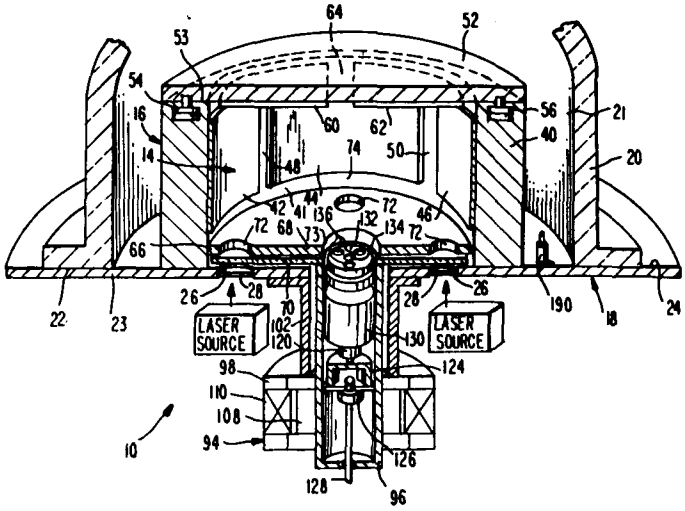
ENGINEERING (GENERAL)

Includes vacuum technology; control engineering; display engineering; cryogenics; and fire prevention.

N90-10310*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.
ELECTROSTATICALLY SUSPENDED ROTOR FOR ANGULAR ENCODER Patent Application
WALTER POLSTORFF, inventor (to NASA) 21 Aug. 1989 35 p
(NASA-CASE-MFS-28294-1; NAS 1.71:MFS-28294-1; US-PATENT-APPL-SN-396262) Avail: NTIS HC A03/MF A01 CSCL 13H

An apparatus for engraving a code strip with coded markings is disclosed. The code strip is attached for rotation to a cylindrical rotor which is mounted within the cavity of a stator. The stator carries electrodes on its top and side walls to which high potentials are applied to electrostatically suspend the rotor. Circuit means sense the position of the rotor with respect to the stator electrodes and adjust the potential to maintain the rotor at its desired location. A drive motor is connected to the rotor through a drive shaft to initially life the rotor into the desired location within the stator and to rotate it at the desired speed. Thereafter, the drive shaft is disconnected from the rotor, and the rotor continues to spin at a highly stable angular velocity, supported only by the electrostatic fields.

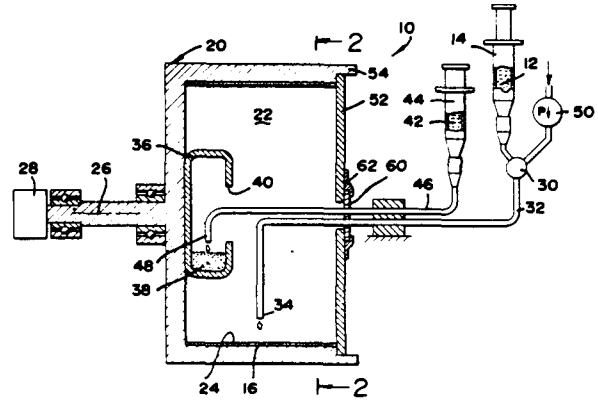
NASA



N90-19425* National Aeronautics and Space Administration. Pasadena Office, CA.
HIGH DENSITY TAPE CASTING SYSTEM Patent
EARL R. COLLINS, JR., inventor (to NASA) 13 Jun. 1989 61 p Filed 21 Oct. 1986
(NASA-CASE-NPO-16901-1-CU; US-PATENT-4,839,121; US-PATENT-APPL-SN-921574; US-PATENT-CLASS-264-114; US-PATENT-CLASS-264-311; US-PATENT-CLASS-425-75; US-PATENT-CLASS-425-425; US-PATENT-CLASS-425-435; US-PATENT-CLASS-425-73) Avail: US Patent and Trademark Office CSCL 13H

A system is provided for casting thin sheets (or tapes) of particles bound together, that are used for oxygen membranes and other applications, which enables the particles to be cast at a high packing density in a tape of uniform thickness. A slurry contains the particles, a binder, and a solvent, and is cast against the inside walls of a rotating chamber. Prior to spraying the slurry against the chamber walls, a solvent is applied to a container. The solvent evaporates to saturate the chamber with solvent vapor. Only then is the slurry cast. As a result, the slurry remains fluid long enough to spread evenly over the casting surface formed by the chamber, and for the slurry particles to become densely packed. Only then is the chamber vented to remove solvent, so the slurry can dry. The major novel feature is applying solvent vapor to a rotating chamber before casting slurry against the chamber walls.

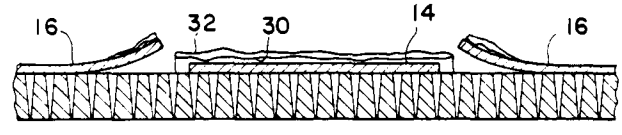
Official Gazette of the U.S. Patent and Trademark Office



N90-19427* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
METHOD FOR MAINTAINING PRECISE SUCTION STRIP POROSITIES Patent
FRANK H. GALLIMORE, inventor (to NASA) (McDonnell-Douglas Corp., Huntington Beach, CA.) 25 Jul. 1989 10 p Filed 22 Jul. 1988
(NASA-CASE-LAR-13638-1; US-PATENT-4,851,071; US-PATENT-APPL-SN-223124; US-PATENT-CLASS-156-344; US-PATENT-CLASS-244-133; US-PATENT-CLASS-427-272)
Avail: US Patent and Trademark Office CSCL 13H

This invention relates to a masking method generally and, more particularly to a method of masking perforated titanium sheets having laminar control suction strips. As illustrated in the drawings, a nonaerodynamic surface of a perforated sheet has alternating suction strip areas and bonding land areas. Suction strip tapes overlie the bonding land areas during application of a masking material to an upper surface of the suction strip tapes. Prior to bonding the perforated sheet to a composite structure, the bonding land tapes are removed. The entire opposite aerodynamic surface is masked with tape before bonding. This invention provides a precise control of suction strip porosities by ensuring that no chemicals penetrate the suction strip areas during bonding.

Official Gazette of the U.S. Patent and Trademark Office



32

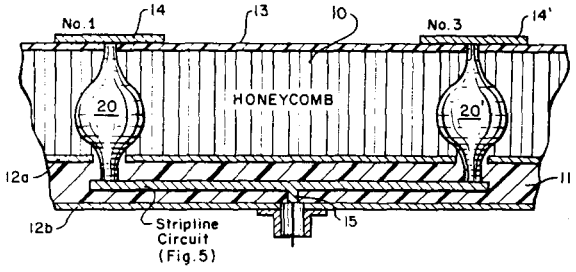
COMMUNICATIONS AND RADAR

Includes radar; land and global communications; communications theory; and optical communications.

N90-16104*# National Aeronautics and Space Administration. Pasadena Office, CA.
STRIPLINE FEED FOR A MICROSTRIP ARRAY OF PATCH ELEMENTS WITH TEARDROP SHAPED PROBES Patent Application
JOHN HUANG, inventor (to NASA) 7 Sep. 1989 24 p
(Contract NAS7-918)
(NASA-CASE-NPO-17548-1-CU; NAS 1.71:NPO-17548-1-CU; US-PATENT-APPL-SN-404293) Avail: NTIS HC A03/MF A01
CSCL 20N

A circularly polarized microstrip array antenna utilizing a honeycomb substrate made of dielectric material to support on one side the microstrip patch elements in an array, and on the other side a stripline circuit for feeding the patch elements in subarray groups of four with angular orientation and phase for producing circularly polarized radiation, preferably at a 0, 90, 180, and 270 degree relationship is described. The probe used for coupling each feed point in the stripline circuit to a microstrip patch element is teardrop shaped in order to introduce capacitance between the coupling probe and the metal sheet of the stripline circuit that serves as an antenna ground plane. The capacitance thus introduced tunes out inductance of the probe. The shape of the teardrop probe is not critical. The probe capacitance required is controlled by the maximum diameter for the teardrop shaped probe, which can be empirically determined for the operating frequency. An aluminum baffle around each subarray blocks out surface wave between subarrays.

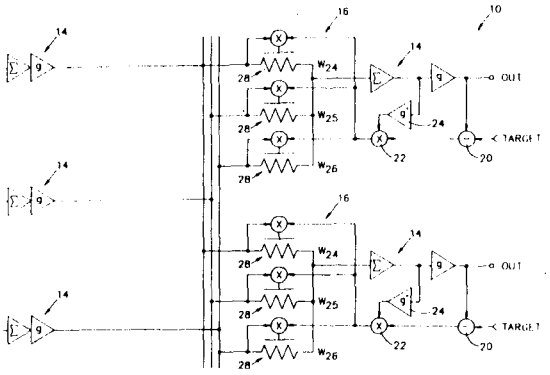
NASA



N90-16974*# National Aeronautics and Space Administration. Pasadena Office, CA.
ANALOG HARDWARE FOR DELTA-BACKPROPAGATION NEURAL NETWORKS Patent Application
SILVIO P. EBERHARDT, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 29 Sep. 1989 17 p
(Contract NAS7-918)
(NASA-CASE-NPO-17564-1-CU; NAS 1.71:NPO-17564-1-CU; US-PATENT-APPL-SN-414811) Avail: NTIS HC A03/MF A01
CSCL 20N

This is a fully parallel analog back propagation learning processor which comprises a plurality of programmable resistive memory elements serving as synapse connections whose values can be weighted during learning with buffer amplifiers, summing circuits, and sample-and-hold circuits arranged in a plurality of neuron layers in accordance with delta- back propagation algorithms modified so as to control weight changes due to circuit drift.

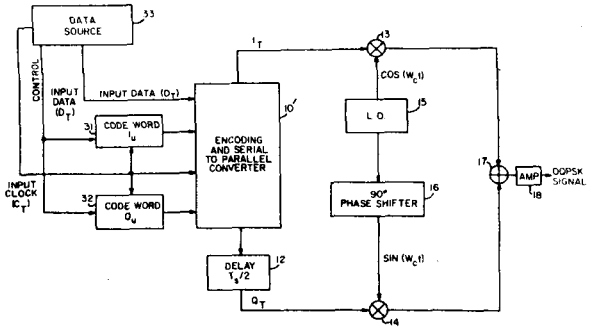
NASA



N90-16975*# National Aeronautics and Space Administration. Pasadena Office, CA.
PHASE AMBIGUITY RESOLUTION FOR OFFSET QPSK MODULATION SYSTEMS Patent Application
TIEN M. NGUYEN, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 30 Nov. 1989 35 p
(Contract NAS7-918)
(NASA-CASE-NPO-17853-1-CU; US-PATENT-APPL-SN-443539; NAS 1.71:NPO-17853-1-CU) Avail: NTIS HC A03/MF A01
CSCL 17B

A demodulator for Offset Quaternary Phase Shift Keyed (OQPSK) signals modulated with two words resolves eight possible combinations of phase ambiguity which may produce data error by first processing received I(sub R) and Q(sub R) data in an integrated carrier loop/symbol synchronizer using a digital Costas loop with matched filters for correcting four of eight possible phase lock errors, and then the remaining four using a phase ambiguity resolver which detects the words to not only reverse the received I(sub R) and Q(sub R) data channels, but to also invert (complement) the I(sub R) and/or Q(sub R) data, or to at least complement the I(sub R) and Q(sub R) data for systems using nontransparent codes that do not have rotation direction ambiguity.

NASA

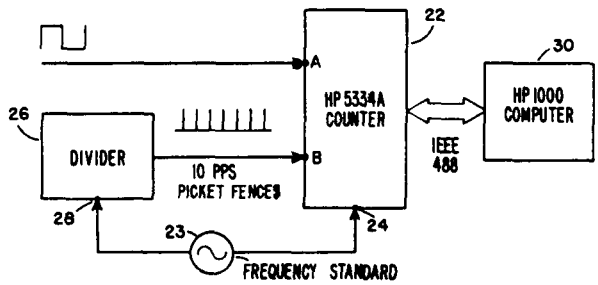


N90-17005* National Aeronautics and Space Administration. Pasadena Office, CA.
APPARATUS FOR USING A TIME INTERVAL COUNTER TO MEASURE FREQUENCY STABILITY Patent
CHARLES A. GREENHALL, inventor (to NASA) 27 Jun. 1989 96 p Filed Apr. 21, 1988 Supersedes N88-24846 (26 - 18, P 2502)
(NASA-CASE-NPO-17325-1-CU; US-PATENT-4,843,328; US-PATENT-APPL-SN-184235; US-PATENT-CLASS-324-78Z; US-PATENT-CLASS-324-78D) Avail: US Patent and Trademark Office CSCL 20N

An apparatus for measuring the relative stability of two signals

is disclosed comprising a means for mixing the two signals down to a beat note sine wave and for producing a beat note square wave whose upcrossings are the same as the sine wave. A source of reference frequency is supplied to a clock divider and interval counter to synchronize them and to generate a picket fence for providing a time reference grid of period shorter than the beat period. An interval counter is employed to make a preliminary measurement between successive upcrossings of the beat note square wave for providing an approximate time interval therebetween as a reference. The beat note square wave and the picket fence are then provided to the interval counter to provide an output consisting of the time difference between the upcrossing of each beat note square wave cycle and the next picket fence pulse such that the counter is ready for each upcrossing and dead time is avoided. A computer containing an algorithm for calculating the exact times of the beat note upcrossings then computes the upcrossing times.

Official Gazette of the U.S. Patent and Trademark Office



33

ELECTRONICS AND ELECTRICAL ENGINEERING

Includes test equipment and maintainability; components, e.g., tunnel diodes and transistors; microminiaturization; and integrated circuitry.

N90-10329*# National Aeronautics and Space Administration. Pasadena Office, CA.

LATERALLY STACKED SCHOTTKY DIODES FOR INFRARED SENSOR APPLICATIONS Patent Application

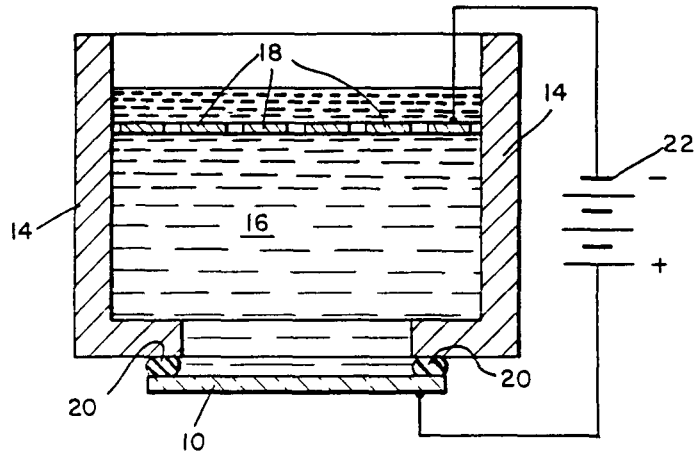
TRUE-LON LIN, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 9 Jun. 1989 12 p Prepared in cooperation with Jet Propulsion Lab., California Inst. of Tech., Pasadena

(Contract NAS7-918)

(NASA-CASE-NPO-17426-1-CU; NAS 1.71:NPO-17426-1-CU; US-PATENT-APPL-SN-363815) Avail: NTIS HC A03/MF A01 CSCL 09A

Laterally stacked Schottky diodes for infrared sensor applications are fabricated utilizing porous silicon having pores. A Schottky metal contract is formed in the pores, such as by electroplating. The sensors may be integrated with silicon circuits on the same chip with a high quantum efficiency, which is ideal for IR focal plane array applications due to uniformity and reproducibility.

NASA



N90-16124*# National Aeronautics and Space Administration. Pasadena Office, CA.

ORGANIC CATHODE FOR A SECONDARY BATTERY Patent Application

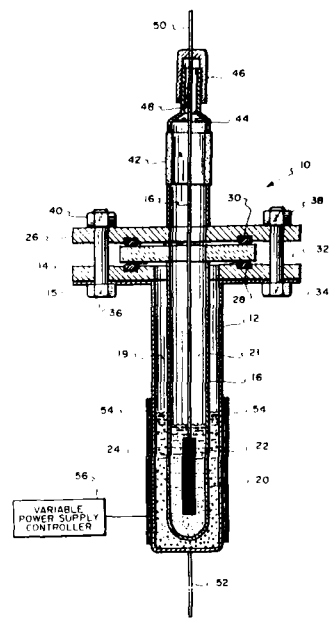
RATNAKUMAR V. BUGGA, inventor (to NASA), SALVADOR DISTEFANO, inventor (to NASA), ROGER M. WILLIAMS, inventor (to NASA), and CLYDE P. BANKSTON, inventor (to NASA) 7 Sep. 1989 20 p

(Contract NAS7-918)

(NASA-CASE-NPO-17604-1-CU; NAS 1.71:NPO-17604-1-CU; US-PATENT-APPL-SN-404288) Avail: NTIS HC A03/MF A01 CSCL 09A

A liquid catholyte for a battery based on liquid metal such as sodium anode and a solid, ceramic separator such as beta alumina (BASE) comprises a mixture of a Group I-III metal salt such as sodium tetrachloroaluminate and a minor amount of an organic carbonitrile depolarizer having at least one adjacent ethylenic band such as 1 to 40 percent by weight of tetracyanoethylene. The tetracyanoethylene forms an adduct with the molten metal salt.

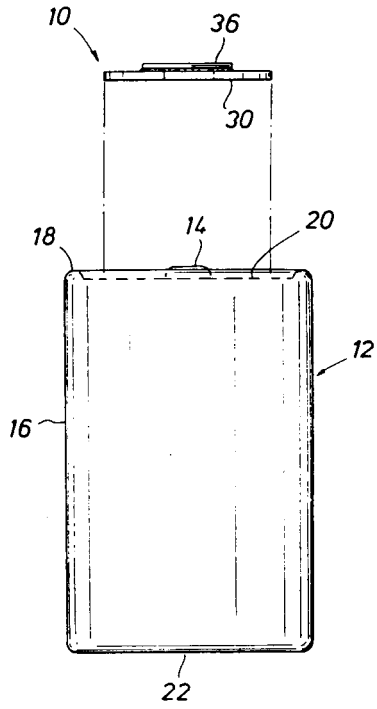
NASA



N90-17008*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
THERMAL SWITCH DISC FOR SHORT CIRCUIT PROTECTION OF BATTERIES Patent Application
ERIC C. DARCY, inventor (to NASA) and BOBBY J. BRAGG, inventor (to NASA) 27 Apr. 1989 13 p
(NASA-CASE-MSC-21428-1; US-PATENT-APPL-SN-343652; NAS 1.71:MSC-21428-1) Avail: NTIS HC A03/MF A01 CSCL 09A

A protective device for one battery or serially arranged battery cells is disclosed and is adapted to fit between one battery and its terminal connector or between adjacent battery cells. The device incorporates a disk of positive temperature coefficient material having a pair of circular end faces for contact. The disk is supported by a ring adhesively joined thereto, the ring having a central axial opening to enable the button terminal of a battery cell to contact against the disk as the disk and battery cell are arranged in a single battery application or in serial contact with similar battery cells.

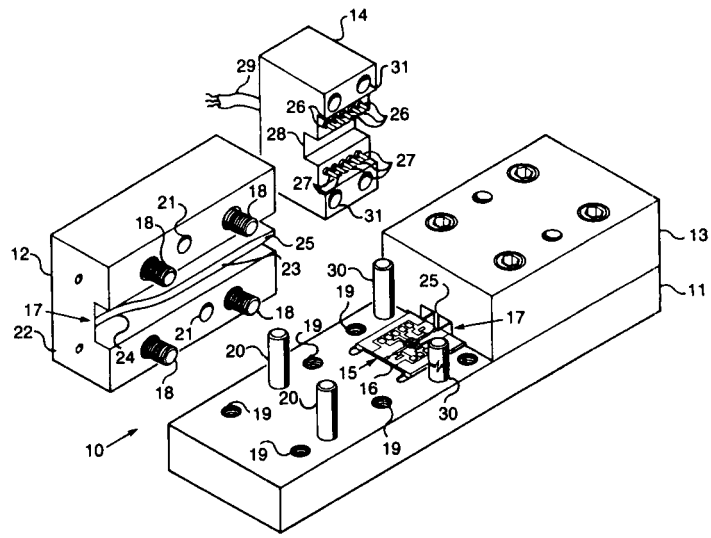
NASA



N90-17009*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
UNIVERSAL NONDESTRUCTIVE MM-WAVE INTEGRATED CIRCUIT TEST FIXTURE Patent Application
ROBERT R. ROMANOFSKY, inventor (to NASA) and KURT A. SHALKHAUSER, inventor (to NASA) 10 Aug. 1989 17 p
(NASA-CASE-LEW-14746-1; US-PATENT-APPL-SN-392239; NAS 1.71:LEW-14746-1) Avail: NTIS HC A03/MF A01 CSCL 09A

Monolithic microwave integrated circuit (MMIC) test includes a bias module having spring-loaded contacts which electrically engage member. RF frequency is applied to and passed from the chip carrier by chamfered edges of ridges in the waveguide passages of housings which are removably attached to the base member. Thru, Delay, and Short calibration standards having dimensions identical to those of the chip carrier assure accuracy and reliability of the test. The MMIC chip fits in an opening in the chip carrier with the boundaries of the MMIC lying on movable reference planes thereby establishing accuracy and flexibility.

NASA

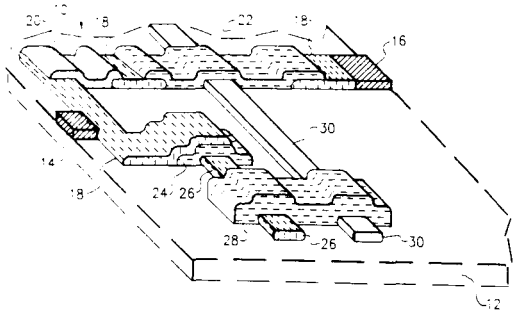


N90-17010*# National Aeronautics and Space Administration. Pasadena Office, CA.
SOLID STATE ELECTRICAL SWITCH EMPLOYING MATERIALS WITH REVERSIBLE PHASE TRANSISTORS Patent Application
ROGER M. WILLIAMS, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 29 Sep. 1989 18 p
(Contract NAS7-918)
(NASA-CASE-NPO-17621-1-CU; NAS 1.71:NPO-17621-1-CU; US-PATENT-APPL-SN-414820) Avail: NTIS HC A03/MF A01 CSCL 09A

A bistable switching element is made of a material whose electrical resistance reversibly decreases in response to intercalation by positive ions. Flow of positive ions between the bistable switching element and a positive ion source is controlled by means of an electrical potential applied across a thermal switching element. The material of the thermal switching element generates heat in response to electrical current flow therethrough, which in turn causes the material to undergo a thermal phase transition from a high electrical resistance state to a low electrical resistance state as the temperature increases above a predetermined value. Application of the electrical potential in one direction renders the thermal switching element conductive to pass electron current out of the ion source. This causes positive ions to flow from the source into the bistable switching element and intercalate the same to produce a non-volatile, low resistance logic state. Application of the electrical potential in the opposite direction causes reverse current flow which de-intercalates the

bistable logic switching element and produces a high resistance logic state.

NASA



N90-17011*# National Aeronautics and Space Administration. Pasadena Office, CA.

COPPER CHLORIDE CATHODE FOR A SECONDARY BATTERY Patent Application

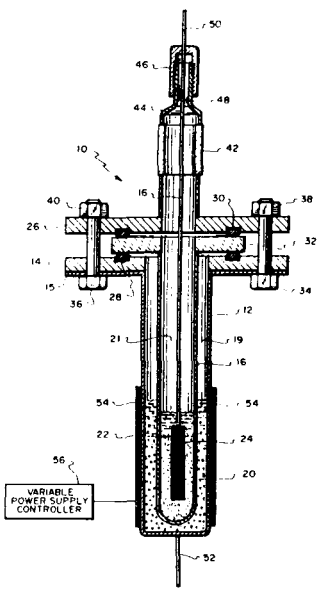
RATNAKUMAR V. BUGGA, inventor (to NASA), SALVADOR DISTEFANO, inventor (to NASA), GANESAN NAGASUBRAMANIAN, inventor (to NASA), and CLYDE P. BANKSTON, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 11 Sep. 1989 13 p

(Contract NAS7-918)

(NASA-CASE-NPO-17640-1-CU; NAS 1.71:NPO-17640-1-CU; US-PATENT-APPL-SN-405169) Avail: NTIS HC A03/MF A01 CSCL 09A

Higher energy and power densities are achieved in a secondary battery based on molten sodium and a solid, ceramic separator such as a beta alumina and a molten catholyte such as sodium tetrachloroaluminate and a copper chloride cathode. The higher cell voltage of copper chloride provides higher energy densities and the higher power density results from increased conductivity resulting from formation of copper as discharge proceeds.

NASA



N90-19492* National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.

A DIGITALLY CONTROLLED SYSTEM FOR EFFECTING AND PRESENTING A SELECTED ELECTRICAL RESISTANCE Patent

JAMES C. FLETCHER, inventor (to NASA) and WALTER L. ROSS, inventor (to NASA) (Rockwell International Corp., Pittsburgh, PA.) 18 Jul. 1989 8 p Filed 15 Jul. 1987

(NASA-CASE-MFS-29149-1; US-PATENT-4,849,903; US-PATENT-APPL-SN-073541; US-PATENT-CLASS-364-482; US-PATENT-CLASS-364-481; US-PATENT-CLASS-324-62; US-PATENT-CLASS-323-354) Avail: US Patent and Trademark Office CSCL 09A

A digitally controlled resistance generator is described, in which resistors having values selected according to an expression 2(sup N-1)(R), where N is equal to the number of terms in the expression, and R is equal to the lowest value of resistance, are electrically inserted into a resistive circuit in accordance with a parallel binary signal provided by an analog-to-digital converter or a programmable computer. This binary signal is coupled via optical isolators which, when activated by a logical 1, provides a negative potential to some or all of the gate inputs of the normally on field effect transistors which, when on, shorts out the associated resistor. This applied negative potential turns the field effect transistors off and electrically inserts the resistor coupled between the source terminal and the drain terminal of that field effect transistor into the resistive circuit between the terminals.

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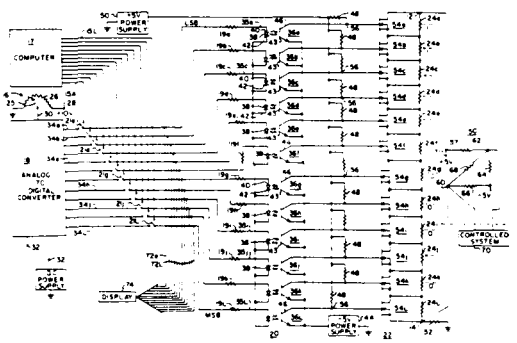


34

FLUID MECHANICS AND HEAT TRANSFER

Includes boundary layers; hydrodynamics; fluidics; mass transfer; and ablation cooling.

N90-17051*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.

LOW-NOISE NOZZLE VALVE Patent Application

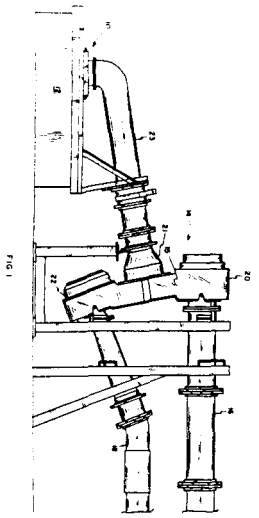
HAL S. GWIN, inventor (to NASA) and JAMES AARON, inventor (to NASA) 7 Sep. 1989 15 p

(NASA-CASE-MFS-28383-1; NAS 1.71:MFS-28383-1; US-PATENT-APPL-SN-404290) Avail: NTIS HC A03/MF A01 CSCL 20D

A low noise, variable discharage area, valve is constructed having opposed recesses within which a pair of gates are slidably disposed. Each of the gates is provided with upstream edges having a radius thereon, the radius enabling smooth, accelerated, low noise flow therebetween. The gates are further provided with tracks along each side, which in turn slide along splines set in the side walls of the valve. A threaded rod which rotates in a threaded insert in a rear wall of each of the gates, serves to

move the gates within their respective recesses.

NASA



N90-19534* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
METHOD AND APPARATUS FOR DETECTING LAMINAR FLOW SEPARATION AND REATTACHMENT Patent
JOHN P. STACK, inventor (to NASA) and SIVARAMAKRISHNAN M. MANGALAM, inventor (to NASA) (Analytical Services and Materials, Inc., Hampton, VA.) 18 Jul. 1989 13 p Filed 7 Jun. 1988
(NASA-CASE-LAR-13952-1-SB; US-PATENT-4,848,153; US-PATENT-APPL-SN-203178; US-PATENT-CLASS-73-432.1)
Avail: US Patent and Trademark Office CSCL 20D

The invention is a method and apparatus for detecting laminar flow separation and flow reattachment of a fluid stream by simultaneously sensing and comparing a plurality of output signals, each representing the dynamic shear stress at one of an equal number of sensors spaced along a straight line on the surface of an airfoil or the like that extends parallel to the fluid stream. The output signals are concurrently compared to detect the sensors across which a reversal in phase of said output signal occurs, said detected sensors being in the region of laminar separation or reattachment. The novelty in this invention is the discovery and use of the phase reversal phenomena to detect laminar separation and attachment of a fluid stream from any surface such as an airfoil supported therein.

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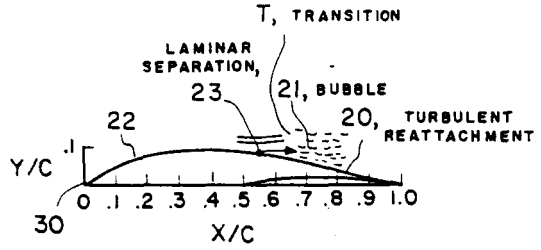


35

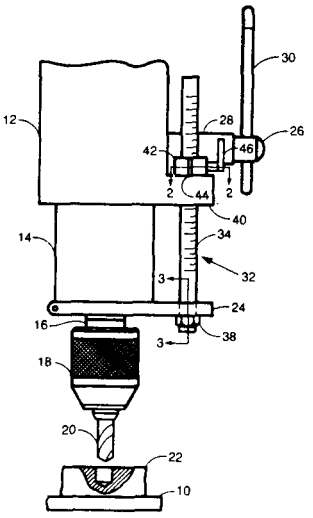
INSTRUMENTATION AND PHOTOGRAPHY

Includes remote sensors; measuring instruments and gages; detectors; cameras and photographic supplies; and holography.

N90-10415*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
ADJUSTABLE DEPTH GAGE Patent Application
ROGER C. FORSGREN, inventor (to NASA) 7 Jul. 1989 10 p
(NASA-CASE-LEW-14880-1; NAS 1.71:LEW-14880-1; US-PATENT-APPL-SN-376738) Avail: NTIS HC A02/MF A01 CSCL 14B

A quick adjust depth gage includes a handle-clamp assembly wherein the clamp includes an opening in which a cylindrical shaft with suitable depth measurement markings thereon is reviewed. Turning the handle on the clamp enables the gage to be set to the desired depth.

NASA

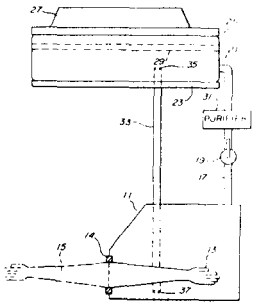


N90-17104*# National Aeronautics and Space Administration. Pasadena Office, CA.
BALLAST SYSTEM FOR MAINTAINING CONSTANT PRESSURE IN A GLOVE BOX Patent Application
PAUL J. SHLICHTA, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 29 Sep. 1989 13 p
(Contract NAS7-918)
(NASA-CASE-NPO-17786-1-CU; NAS 1.71:NPO-17786-1-CU; US-PATENT-APPL-SN-414812) Avail: NTIS HC A03/MF A01 CSCL 14B

A ballast system is disclosed for a glove box including a fixed platform on which is mounted an inflatable bag on top of which resides a cover and a weight. The variable gas volume of the inflatable bag communicates with that of the glove box via a valved tube. The weight and the gas volume are selected to maintain a relatively constant pressure in the glove box despite variations in

the glove box volume while avoiding the use of complicated valving apparatus.

NASA



N90-17117* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

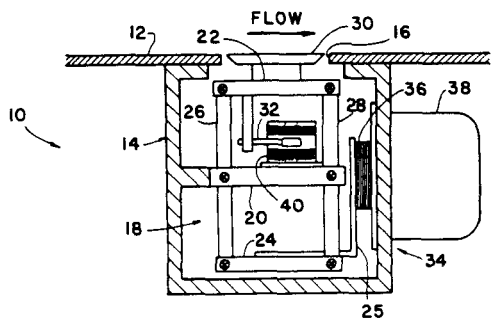
SKIN FRICTION BALANCE Patent

TCHENG PING, inventor (to NASA) and FRANK H. SUPPLEE, JR., inventor (to NASA) 6 Jun. 1989 9 p Filed Jun. 23, 1988 Supersedes N88-29145 (26 - 23, p 3216)

(NASA-CASE-LAR-13710-1; US-PATENT-4,836,035; US-PATENT-APPL-SN-210487; US-PATENT-CLASS-73-862.61; US-PATENT-CLASS-73-147) Avail: US Patent and Trademark Office CSCL 14B

A skin friction balance uses a parallel linkage mechanism to avoid inaccuracies in skin friction measurement attributable to off-center normal forces. The parallel linkage mechanism includes a stationary plate mounted in a cage, and an upper and lower movable plate which are linked to each other and to the stationary plate throught three vertical links. Flexure pivots are provided for pivotally connecting the links and the plates. A sensing element connected to the upper plate moves in response to skin friction, and the lower plate moves in the opposite direction of the upper plate. A force motor maintains a null position of the sensing element by exerting a restoring force in response to a signal generated by a linear variable differential transformer (LVDT).

Official Gazette of the U.S. Patent and Trademark Office



N90-17118* National Aeronautics and Space Administration. Pasadena Office, CA.

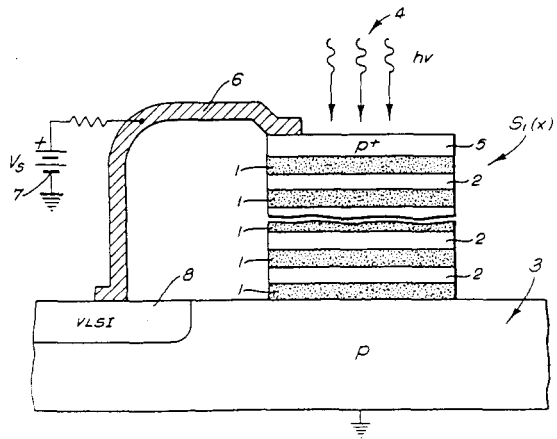
TAILORABLE INFRARED SENSING DEVICE WITH STRAIN LAYER SUPERLATTICE STRUCTURE Patent

LI-JEN CHENG, inventor (to NASA) (California Inst. of Tech., Pasadena.) 27 Jun. 1989 10 p Filed Nov. 25, 1987

(NASA-CASE-NPO-16617-2-CU; US-PATENT-4,843,439; US-PATENT-APPL-SN-125676; US-PATENT-CLASS-357-4; US-PATENT-CLASS-357-30; US-PATENT-CLASS-357-13; US-PATENT-CLASS-357-61) Avail: US Patent and Trademark Office CSCL 14B

An infrared photodetector is formed of a heavily doped p-type Ge(x)Si(1-x)/Si superlattice in which x is pre-established during manufacture in the range 0 to 100 percent. A custom tailored photodetector that can differentiate among close wavelengths in the range of 2.7 to 50 microns is fabricated by appropriate selection of the alloy constituency value, x, to establish a specific wavelength at which photodetection cut-off will occur.

Official Gazette of the U.S. Patent and Trademark Office



36

LASERS AND MASERS

Includes parametric amplifiers.

N90-17132* National Aeronautics and Space Administration. Pasadena Office, CA.

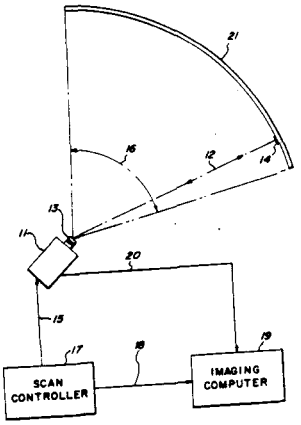
NONCONTACT TEMPERATURE PATTERN MEASURING DEVICE Patent

DANIEL D. ELLEMAN, inventor (to NASA), JAMES L. ALLEN, inventor (to NASA), and MARK C. LEE, inventor (to NASA) (California Inst. of Tech., Pasadena.) 20 Jun. 1989 11 p Filed Feb. 23, 1988

(NASA-CASE-NPO-17824-1-CU; US-PATENT-4,840,496; US-PATENT-APPL-SN-159613; US-PATENT-CLASS-374-124; US-PATENT-CLASS-356-43; US-PATENT-CLASS-374-126; US-PATENT-CLASS-374-130) Avail: US Patent and Trademark Office CSCL 20E

Laser pyrometer techniques are utilized to accurately image a true temperature distribution on a given target without touching the target and without knowing the localized emissivity of the target. The pyrometer utilizes a very high definition laser beam and photodetector, both having a very narrow focus. The pyrometer is mounted in a mechanism designed to permit the pyrometer to be aimed and focused at precise localized points on the target surface. The pyrometer is swept over the surface area to be imaged,

temperature measurements being taken at each point of focus.
Official Gazette of the U.S. Patent and Trademark Office



37

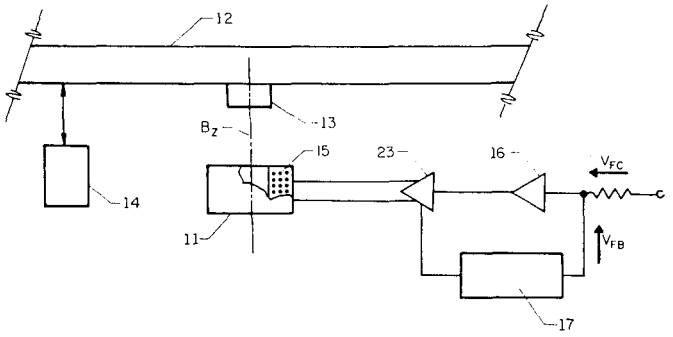
MECHANICAL ENGINEERING

Includes auxiliary systems (nonpower); machine elements and processes; and mechanical equipment.

N90-15442*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
SINGLE ELEMENT MAGNETIC SUSPENSION ACTUATOR Patent Application
NELSON J. GROOM, inventor (to NASA) 11 Sep. 1989 16 p
(NASA-CASE-LAR-13981-1; NAS 1.71:LAR-13981-1; US-PATENT-APPL-SN-405154) Avail: NTIS HC A03/MF A01 CSCL 13I

The invention, a single element magnetic suspension actuator with bidirectional force capability along a single axis, includes an electromagnet and a nonmagnetic suspended element. A permanent magnet mounted on the suspended element interacts with a magnetic field established by the electromagnet to produce bidirectional forces in response to a variable force command voltage V(sub FC) applied to the electromagnet. A sensor measures the position of the suspended element on the single axis which is a function of force command voltage V(sub FC).

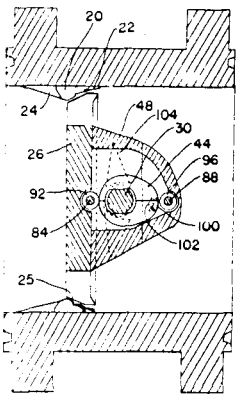
NASA



N90-15443*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.
HYBRID BUTTERFLY VALVE Patent Application
LAURENCE DEQUAY, inventor (to NASA) 7 Sep. 1989 15 p
(NASA-CASE-SSC-00004; US-PATENT-APPL-SN-404292; NAS 1.71:SSC-00004) Avail: NTIS HC A03/MF A01 CSCL 13K

A hybrid butterfly valve has a stationary seat and a valve closure disk which may rotate together with an actuating shaft from the fully open position to a position wherein the disk is aligned with the seat, and may be moved linearly into a sealing relationship with the seat. The disk is supported by brackets having an elongated slot through which the shaft extends, the brackets being adapted to move linearly relative to the shaft. Cams fastened to the shaft initiate a 90 degree rotation of the disk from the fully open position to the position where the valve disk is aligned with the seat, and the cams act in conjunction with followers carried by the disk to move the disk and the brackets linearly. The disk carries guide members which are positioned in a guide slot, the guide slot having an arcuate portion and a linear portion, and the disk is guided by the guide members guided in the arcuate portion when the disk is fully opened to and until the disk is aligned with the seat, and the guide members are guided by the linear portion of the slot. A portion of each cam is spring biased so that the cams tightly engage follower rollers carried by the brackets during the rotational portion of the movement of the disk.

NASA

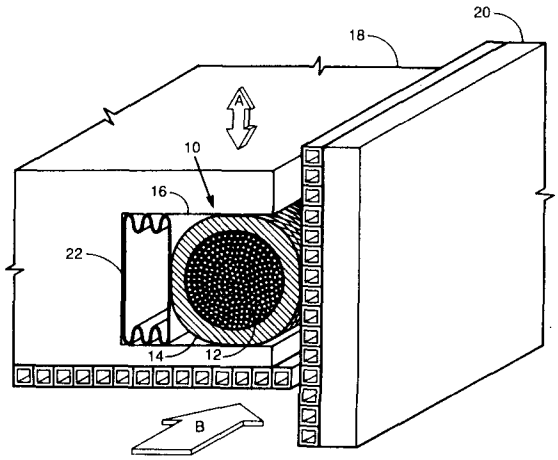


N90-15444*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
HIGH TEMPERATURE, FLEXIBLE, THERMAL BARRIER SEAL Patent Application
PAUL J. SIROCCKY and BRUCE M. STEINETZ 27 Nov. 1989 13 p
(NASA-CASE-LEW-14672-1; NAS 1.71:LEW-14672-1; US-PATENT-APPL-SN-441672) Avail: NTIS HC A03/MF A01 CSCL 11A

This device seals the sliding interfaces between structural panels that are roughly perpendicular to each other or whose edges are butted against one another. The nonuniformity of the gap between the panels requires significant flexibility along the seal length. The seal is mounted in a rectangular groove in a moveable structural panel. A plurality of particles or balls is densely packed in an outer sheathing. The balls are laterally preloaded to maintain sealing contact with the adjacent wall using a pressurized linear bellows. Distortions in the adjacent panel are accommodated by rearrangement of the particles within the outer sheathing. Leakage through the seal is minimized by densely compacting the internal particles and by maintaining positive preload along the back side of the seal. The braid architecture of the outer sheathing

is selected to minimize leakage through the seal and to resist mechanical abrasion.

NASA



N90-15445*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

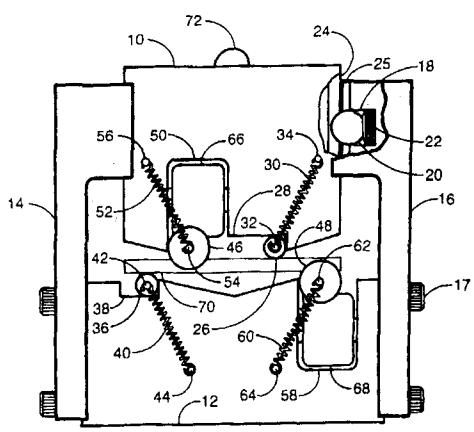
FULLY ARTICULATED FOUR-POINT-BEND LOADING FIXTURE Patent Application

ANTHONY M. CALOMINO, *inventor (to NASA)* 28 Dec. 1989 11 p

(NASA-CASE-LEW-14776-1; US-PATENT-APPL-SN-458274; NAS 1.71:LEW-14776-1) Avail: NTIS HC A03/MF A01 CSCL 13I

A fully articulated four-point bend loading fixture for Modulus of Rupture (MOR) and fracture toughness specimens utilizes an upper loading plate in combination with a lower loading plate. The lower plate has a pair of spring loaded ball bearings which seat in V-shaped grooves located in the upper plate. The ball bearings are carried in the arms of the lower plate. A load is applied to the specimen through steel rollers, one large roller and one smaller roller each located on both the upper and lower plates. The large rollers have needle roller bearings which enable a single loading roller to rotate relative to the plate to which it is attached.

NASA



N90-16272*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

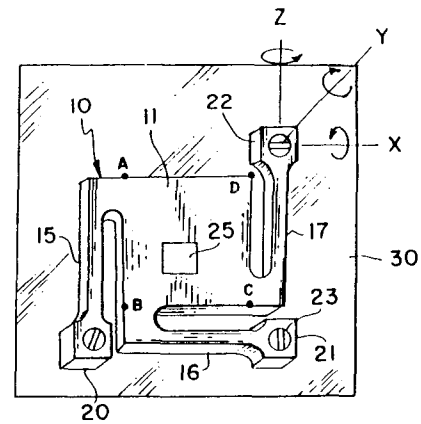
MECHANICAL STRAIN ISOLATOR MOUNT Patent Application

GORDON E. JAMES, inventor (to NASA) (TRW Space Technology Labs., Redondo Beach, CA.) 27 Nov. 1989 7 p Sponsored by NASA

(NASA-CASE-LAR-13580-1; NAS 1.71:LAR-13580-1; US-PATENT-APPL-SN-441673) Avail: NTIS HC A02/MF A01 CSCL 13I

Certain devices such as optical instruments must preserve their alignmental integrity while being subjected to mechanical strain. A mechanical strain isolator mount is provided to preserve the alignmental integrity of an alignment sensitive instrument. An alignment sensitive instrument is mounted on a rectangular base. Flexural legs are connected at their proximal ends to the rectangular base. Flexural legs are also spaced parallel to the sides. Mounting pads are connected to the legs at the distal end and the mechanical strain isolator mount is attached to the substrate by means of threaded bolts. When a mounting pad and its respective leg is subjected to lateral strain in either the X or Y direction via the substrate, the respective leg relieves the strain by bending in the direction of the strain. An axial strain on a mounting pad in the Z direction is relieved by a rotational motion of the legs in the direction of the strain. When the substrate is stress free, the flexural legs return to their original condition and thus preserve the original alignment integrity of the alignment sensitive instrument.

NASA



N90-17137*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.

METHOD AND APPARATUS FOR POSITIONING A ROBOTIC END EFFECTOR Patent Application

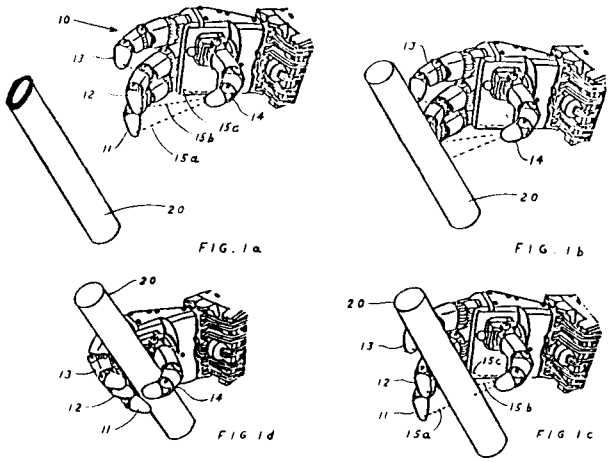
CLIFF HESS, inventor (to NASA) and LARRY C. H. LI, inventor (to NASA) 10 Aug. 1989 24 p

(NASA-CASE-MSC-21476-1; NAS 1.71:MSC-21476-1; US-PATENT-APPL-SN-392235) Avail: NTIS HC A03/MF A01 CSCL 13I

A robotic end effector and operation protocol for a reliable grasp of a target object irrespective of the target's contours is disclosed. A robotic hand includes a plurality of jointed fingers, one of which, like a thumb, is in opposed relation to the other. Each finger is comprised of at least two jointed sections, and provided with reflective proximity sensors, one on the inner surface of each finger section. Each proximity sensor comprises a transmitter of a beam of radiant energy and means for receiving reflections of the transmitted energy when reflected by a target object and for generating electrical signals responsive thereto. On the fingers opposed to the thumb, the proximity sensors on the outermost finger sections are aligned in an outer sensor array and the sensors on the intermediate finger sections and sensors on the innermost finger sections are similarly arranged to form an

intermediate sensor array and an inner sensor array, respectively. The invention includes a computer system with software and/or circuitry for a protocol comprising the steps in sequence of: (1) approach axis alignment to maximize the number of outer layer sensors which detect the target; (2) non-contact contour following the target by the robot fingers to minimize target escape potential; and (3) closing to rigidize the target including dynamically re-adjusting the end effector finger alignment to compensate for target motion. A signal conditioning circuit and gain adjustment means are included to maintain the dynamic range of low power reflection signals.

NASA



N90-17138*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.

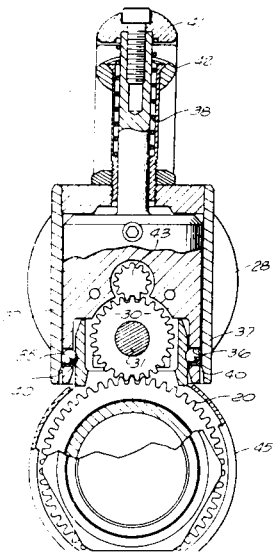
MECHANIZED FLUID CONNECTOR AND ASSEMBLY TOOL SYSTEM Patent Application

RONALD C. ZENTNER, inventor (to NASA) and STEVEN A. SMITH, inventor (to NASA) (Boeing Aerospace Co., Seattle, WA.) 9 Nov. 1989 16 p

(NASA-CASE-MSC-21434-1; NAS 1.71:MSC-21434-1; US-PATENT-APPL-SN-433881) Avail: NTIS HC A03/MF A01 CSCL 13I

A fluid connector system is disclosed which includes a modified plumbing union having a rotatable member for drawing said union into a fluid tight condition. A drive tool is electric motor actuated and includes a reduction gear train providing an output gear engaging an integral peripheral spur gear on the rotatable member. Coaxial alignment means are attached to both the connector assembly and the drive tool. A hand lever actuated latching system includes a plurality of circumferentially spaced latching balls selectively wedged against the alignment means attached to the connector assembly or to secure the drive tool with its output gear in mesh with the integral peripheral spur gear. The drive motor is torque, speed, and direction controllable.

NASA



N90-17153* National Aeronautics and Space Administration. Pasadena Office, CA.

ARTICULATED SUSPENSION SYSTEM Patent

DONALD B. BICKLER, inventor (to NASA) 20 Jun. 1989 7 p Filed Apr. 21, 1988 Supersedes N88-24973 (26 - 18, p 2524)

(NASA-CASE-NPO-17354-1-CU; US-PATENT-4,840,394; US-PATENT-APPL-SN-184236; US-PATENT-CLASS-280-677; US-PATENT-CLASS-280-682) Avail: US Patent and Trademark Office CSCL 13I

The invention provides a rough terrain vehicle which maintains a substantially constant weight, and therefore traction, on all wheels, despite one wheel moving considerably higher or lower than the others, while avoiding a very soft spring suspension. The vehicle includes a chassis or body to be supported and a pair of side suspensions at either side of the body. In a six wheel vehicle, each side suspension includes a middle wheel, and front and rear linkages respectively coupling the front and rear wheels to the middle wheel. A body link pivotally connects the front and rear linkages together, with the middle of the body link rising or falling by only a fraction of the rise or fall of any of the three wheels. The body link pivotally supports the middle of the length of the body. A transverse suspension for suspending the end of the body on the side suspensions includes a middle part pivotally connected to the body about a longitudinal axis and opposite ends each pivotally connected to one of the side suspensions along at least a longitudinal axis.

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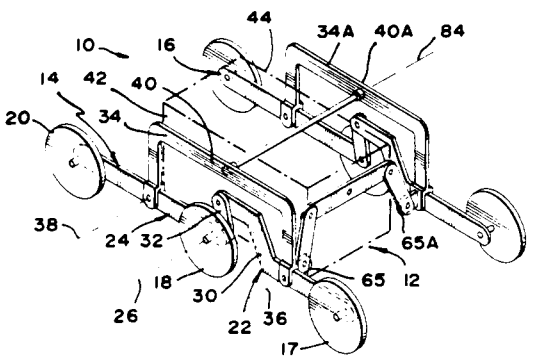

N90-17154* National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.
RELEASABLE CLAMPING APPARATUS Patent
W. NEILL MYERS, inventor (to NASA) 6 Jun. 1989 11 p Filed Sep. 24, 1987
(NASA-CASE-MFS-28192-1; US-PATENT-4,836,707; US-PATENT-APPL-SN-093417; US-PATENT-CLASS-403-322; US-PATENT-CLASS-403-325; US-PATENT-CLASS-403-328; US-PATENT-CLASS-292-27; US-PATENT-CLASS-292-34; US-PATENT-CLASS-24-635) Avail: US Patent and Trademark Office CSCL 13I

In accordance with this invention, a releasable clamping apparatus was constructed having an opening or slot within which a lifting handle is clamped between retaining latch portions and a clamp assembly. The latch portions are supported by openings and are retracted and extended into a slot by spring biased linkage members. These members are acted upon by similarly profiled cam lobes. Dissimilarly profiled cam lobes of the cam member act upon the clamp assembly, clamping a hangle against faces of the latch portions. The cam member is coupled to a shaft having an operating handle with the shaft also being provided with a detent assembly. This detent assembly locks the handle and the shaft in locked positions in the surface of the apparatus, which clamps a handle as described. When the handle is rotated to position the detent assembly is one of the release openings, the clamp assembly and the latch portions are withdrawn into their respective openings, releasing the handle.

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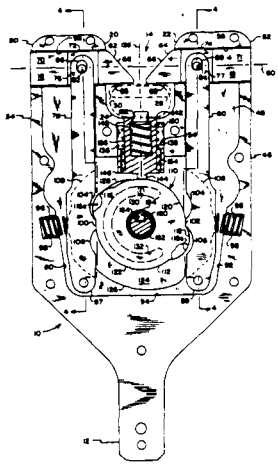

N90-19602* National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.
TRAILER SHIELD ASSEMBLY FOR A WELDING TORCH Patent
GERALD E. DYER, inventor (to NASA) (Rockwell International Corp., Huntsville, AL.) 13 Jun. 1989 8 p Filed 16 Feb. 1988
(NASA-CASE-MFS-29260-1; US-PATENT-4,839,489; US-PATENT-APPL-SN-156059; US-PATENT-CLASS-219-74; US-PATENT-CLASS-219-72) Avail: US Patent and Trademark Office CSCL 13I

This invention relates generally to trailer shields for gas shielded arc welding torches, and more particularly to a trailer shield assembly provided with a shield gas manifold for providing an even dispersion of shield gas to the interior of the shield assembly, which generally encloses a joint being welded and a welding trailing portion of hot welded metal. The novelty of the invention lies in providing trailer shield with a manifold tube having a plurality of openings from which shield gas is distributed. A gas manifold region ahead of the torch is also provided with shield gas from a tube to protect metal preheated by the torch. Further novelty lies in constructing portions of sides and housing and portions of side walls of the guide of stainless steel screen having a tight mesh.

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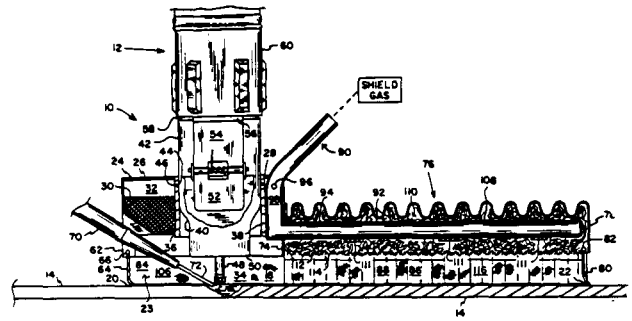

51

LIFE SCIENCES (GENERAL)

N90-17252* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
BIO-REACTOR CHAMBER Patent
JOSEPH A. CHANDLER, inventor (to NASA) 13 Jun. 1989 9 p Filed Aug. 20, 1987
(NASA-CASE-MSC-20929-1; US-PATENT-4,839,046; US-PATENT-APPL-SN-087358; US-PATENT-CLASS-210-355; US-PATENT-CLASS-210-414; US-PATENT-CLASS-435-311; US-PATENT-CLASS-435-316) Avail: US Patent and Trademark Office CSCL 06C

A bioreactor for cell culture is disclosed which provides for the introduction of fresh medium without excessive turbulent action. The fresh medium enters the bioreactor through a filter with a backwash action which prevents the cells from settling on the filter. The bioreactor is sealed and depleted medium is forced out of the container as fresh medium is added.

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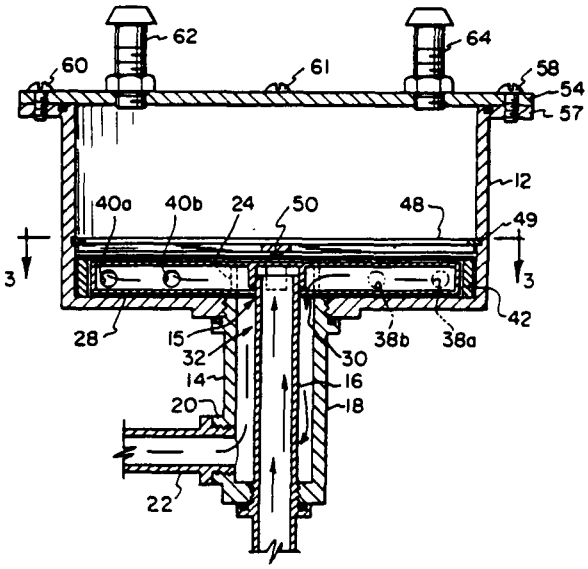


N90-18852*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
THREE-DIMENSIONAL COCULTURE PROCESS Patent Application
DAVID A. WOLF, inventor (to NASA) and THOMAS J. GOODWIN, inventor (to NASA) (Krug International, Houston, TX.) 2 Mar. 1989 27 p
(NASA-CASE-MSC-21560-1; NAS 1.71:MSC-21560-1; US-PATENT-APPL-SN-317931) Avail: NTIS HC A03/MF A01 CSCL 06C

The present invention relates to a 3-dimensional co-culture process, more particularly to methods or co-culturing at least two types of cells in a culture environment, either in space or in unit gravity, with minimum shear stress, freedom for 3-dimensional spatial orientation of the suspended particles and localization of particles with differing or similar sedimentation properties in a similar spatial region to form 3-dimensional tissue-like structures. Several examples of multicellular 3-dimensional experiences are included. The protocol and procedure are also set forth. The process allows simultaneous culture of multiple cell types and supporting substrates in a manner which does not disrupt the 3-dimensional spatial orientation of these components. The co-cultured cells cause a mutual induction effect which mimics the natural hormonal signals and cell interactions found in the intact organism. This causes the tissues to differentiate and form higher 3-dimensional structures such as glands, junctional complexes polypoid geometries, and microvilli which represent the corresponding in-vitro structures to a greater degree than when the cell types are cultured individually or by conventional processes. This process was clearly demonstrated for the case of two epithelial derived colon cancer lines, each co-cultured with normal human fibroblasts and with microcarrier bead substrates. The results clearly demonstrate increased 3-dimensional tissue-like structure and biochemical evidence of an increased differentiation state. With the present invention a variety of cells may be co-cultured to produce tissue which has 3-dimensionality and has some of the characteristics of in-vitro tissue. The process provides enhanced 3-dimensional tissue which create a multicellular organoid differentiation model.

NASA

52

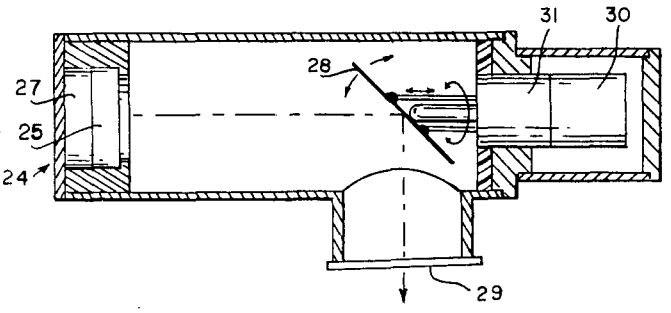
AEROSPACE MEDICINE

Includes physiological factors; biological effects of radiation; and effects of weightlessness on man and animals.

N90-16391*# National Aeronautics and Space Administration. Pasadena Office, CA.
APPARATUS FOR IMAGING DEEP ARTERIAL AND CORONARY LESIONS Patent Application
JAMES A. ROONEY, inventor (to NASA), RICHARD C. HEYSER, inventor (to NASA), and DENNIS H. LECROISSETTE, inventor (to NASA) 1 Dec. 1989 24 p
(Contract NAS7-918)
(NASA-CASE-NPO-17439-1-CU; NAS 1.71:NPO-17439-1-CU; US-PATENT-APPL-SN-444248) Avail: NTIS HC A03/MF A01 CSCL 06B

A reflection-mode ultrasonic system uses time-delay spectrometry (TDS) for imaging of variations in a property of deep arterial and coronary tissue within a volume at a range from a transmitting transducer. A receiving transducer mounted concentric with the transmitting transducer provides a return signal that is demodulated by the sweep of the TDS using a balanced mixer to present a complex signal representative of a property within a volume of tissue. The complex signal is amplified and filtered before mixing with a frequency signal from a local generator to establish a zero range reference for A-scan display of the return signal, but before display the offset return signal is transformed by a fast Fourier transform processor from the frequency domain to a time domain to present the return signal for display as a time-based range signal. A B-scan display may be provided by additionally scanning the transducers in a linear path across the tissue.

NASA



61

COMPUTER PROGRAMMING AND SOFTWARE

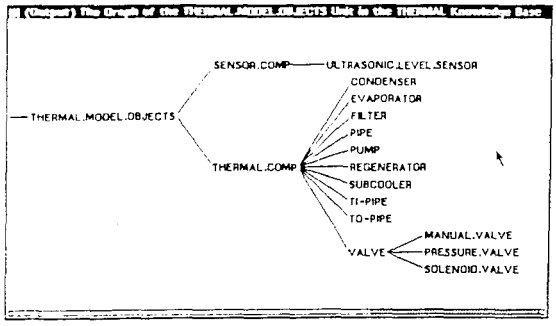
Includes computer programs, routines, and algorithms, and specific applications, e.g., CAD/CAM.

N90-16410*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
DISCRETE EVENT SIMULATION TOOL FOR ANALYSIS OF QUALITATIVE MODELS OF CONTINUOUS PROCESSING SYSTEMS Patent Application
JANE T. MALIN, inventor (to NASA), BRYAN D. BASHAM, inventor (to NASA), and RICHARD A. HARRIS, inventor (to NASA) (Mitre Corp., McLean, VA.) 14 Jul. 1988 70 p Sponsored by NASA
(NASA-CASE-MSC-21465-1; NAS 1.71:MSC-21465-1; US-PATENT-APPL-SN-219295) Avail: NTIS HC A04/MF A01 CSCL 09B

An artificial intelligence design and qualitative modeling tool is disclosed for creating computer models and simulating continuous activities, functions, and/or behavior using developed discrete event techniques. Conveniently, the tool is organized in four modules: library design module, model construction module, simulation module, and experimentation and analysis. The library design module supports the building of library knowledge including component classes and elements pertinent to a particular domain of continuous activities, functions, and behavior being modeled. The continuous behavior is defined discretely with respect to invocation statements, effect statements, and time delays. The functionality of the components is defined in terms of variable cluster instances, independent processes, and modes, further defined in terms of mode transition processes and mode dependent processes. Model construction utilizes the hierarchy of libraries and connects them with appropriate relations. The simulation executes a specialized initialization routine and executes events in a manner that includes selective inherency of characteristics through a time and event schema until the event queue in the simulator is emptied. The experimentation and analysis module supports analysis through the generation of appropriate log files

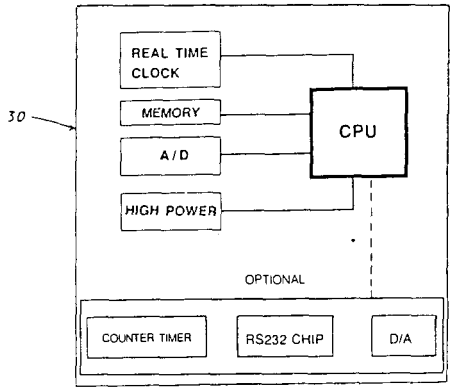
and graphics developments and includes the ability of log file comparisons.

NASA



memory devices (C1, C2...) of the master accomplishes a parallel loading into the memory devices (S1, S2...) of the slave.

NASA



N90-16411*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.

BUS PROGRAMMABLE SLAVE MODULE Patent Application

WILLIAM A. HALL, inventor (to NASA) (Krug International, Houston, TX.) 15 Mar. 1989 27 p

(NASA-CASE-MSC-21387-1; NAS 1.71:MSC-21387-1; US-PATENT-APPL-SN-323748) Avail: NTIS HC A03/MF A01 CSCL 09B

A bus programmable slave module card for use in a computer control system is disclosed which comprises a master computer and one or more slave computer modules interfacing by means of a bus. Each slave module includes its own microprocessor, memory, and control program for acting as a single loop controller. The slave card includes a plurality of memory means (S1, S2...) corresponding to a like plurality of memory devices (C1, C2...) in the master computer, for each slave memory means its own communication lines connectable through the bus with memory communication lines of an associated memory device in the master computer, and a one-way electronic door which is switchable to either a closed condition or a one-way open condition. With the door closed, communication lines between master computer memory (C1, C2...) and slave memory (S1, S2...) are blocked. In the one-way open condition invention, the memory communication lines or each slave memory means (S1, S2...) connect with the memory communication lines of its associated memory device (C1, C2...) in the master computer, and the memory devices (C1, C2...) of the master computer and slave card are electrically parallel such that information seen by the master's memory is also seen by the slave's memory. The slave card is also connectable to a switch for electronically removing the slave microprocessor from the system. With the master computer and the slave card in programming mode relationship, and the slave microprocessor electronically removed from the system, loading a program in the

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COMPUTER SYSTEMS

Includes computer networks and special application computer systems.

N90-10608*# National Aeronautics and Space Administration. Pasadena Office, CA.

NETWORK OF DEDICATED PROCESSORS FOR FINDING LOWEST-COST MAP PATH Patent Application

SILVIO P. EBERHARDT, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 26 May 1989 12 p Prepared in cooperation with Jet Propulsion Lab., California Inst. of Tech., Pasadena

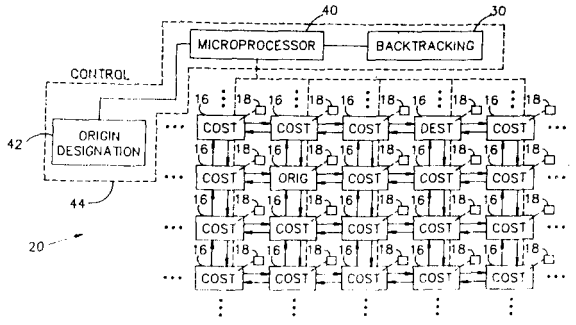
(Contract NAS7-918)

(NASA-CASE-NPO-17716-1-CU; NAS 1.71:NPO-17716-1-CU; US-PATENT-APPL-SN-357759) Avail: NTIS HC A03/MF A01 CSCL 09B

A method and associated apparatus are disclosed for finding the lowest cost path of several variable paths. The paths are comprised of a plurality of linked cost-incurring areas existing between an origin point and a destination point. The method comprises the steps of, connecting a purality of nodes together in the manner of the cost-incurring areas; programming each node to have a cost associated therewith corresponding to one of the cost-incurring areas; injecting a signal into one of the nodes representing the origin point; propagating the signal through the plurality of nodes from inputs to outputs; reducing the signal in magnitude at each node as a function of the respective cost of the node; and, starting at one of the nodes representing the destination point and following a path having the least reduction in magnitude of the signal from node to node back to one of the nodes representing the origin point whereby the lowest cost path

from the origin point to the destination point is found.

NASA



disconnecting desired ones of the nodes from both cables.

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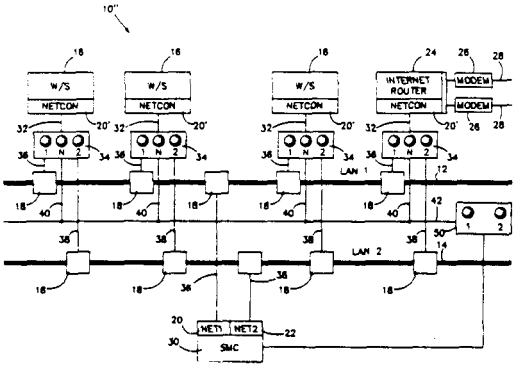

N90-19776* National Aeronautics and Space Administration. Pasadena Office, CA.

LOCAL AREA NETWORK WITH FAULT-CHECKING, PRIORITIES, AND REDUNDANT BACKUP Patent

SERGIO MORALES, inventor (to NASA) and GARY L. FRIEDMAN, inventor (to NASA) (California Inst. of Tech., Pasadena.) 11 Jul. 1989 16 p Filed 8 Sep. 1986

(NASA-CASE-NPO-16949-1-CU; US-PATENT-4,847,837; US-PATENT-APPL-SN-927987; US-PATENT-CLASS-371-8; US-PATENT-CLASS-370-16) Avail: US Patent and Trademark Office CSCL 09B

This invention is a redundant error detecting and correcting local area networked computer system having a plurality of nodes each including a network connector board within the node for connecting to an interfacing transceiver operably attached to a network cable. There is a first network cable disposed along a path to interconnect the nodes. The first network cable includes a plurality of first interfacing transceivers attached thereto. A second network cable is disposed in parallel with the first cable and, in like manner, includes a plurality of second interfacing transceivers attached thereto. There are a plurality of three position switches each having a signal input, three outputs for individual selective connection to the input, and a control input for receiving signals designating which of the outputs is to be connected to the signal input. Each of the switches includes means for designating a response address for responding to addressed signals appearing at the control input and each of the switches further has its signal input connected to a respective one of the input/output lines from the nodes. Also, one of the three outputs is connected to a repective one of the plurality of first interfacing transceivers. There is master switch control means having an output connected to the control inputs of the plurality of three position switches and an input for receiving directive signals for outputting addressed switch position signals to the three position switches as well as monitor and control computer means having a pair of network connector boards therein connected to respective ones of one of the first interfacing transceivers and one of the second interfacing transceivers and an output connected to the input of the master switch means for monitoring the status of the networked computer system by sending messages to the nodes and receiving and verifying messages therefrom and for sending control signals to the master switch to cause the master switch to cause respective ones of the nodes to use a desired one of the first and second cables for transmitting and receiving messages and for

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PHYSICS (GENERAL)

N90-17403*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

PERMANENT MAGNET FLUX-BIASED MAGNETIC ACTUATOR WITH FLUX FEEDBACK Patent Application

NELSON J. GROOM, inventor (to NASA) 11 Sep. 1989 17 p Sponsored by NASA

(NASA-CASE-LAR-13785-1; NAS 1.71:LAR-13785-1; US-PATENT-APPL-SN-405168) Avail: NTIS HC A03/MF A01 CSCL 20C

The invention is a permanent magnet flux-biased magnetic actuator with flux feedback for adjustably suspending an element on a single axis. The magnetic actuator includes a pair of opposing electromagnets and provides bi-directional forces along the single axis to the suspended element. Permanent magnets in flux feedback loops from the opposing electromagnets establish a reference permanent magnet flux-bias to linearize the force characteristics of the electromagnets to extend the linear range of the actuator without the need for continuous bias currents in the electromagnets.

NASA

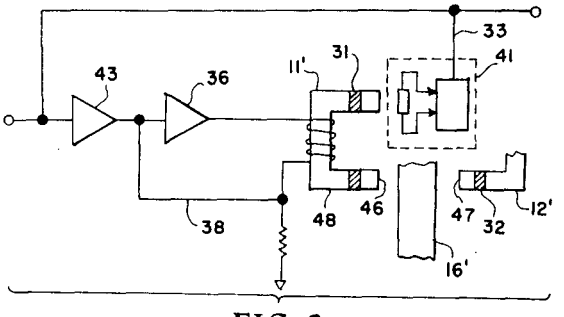

FIG. 3

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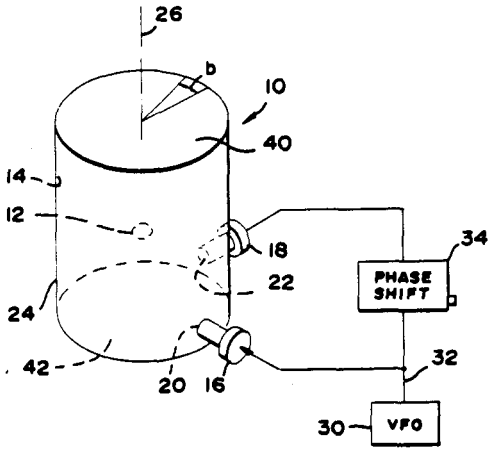
ACOUSTICS

Includes sound generation, transmission, and attenuation.

N90-12289* National Aeronautics and Space Administration. Pasadena Office, CA.
ACOUSTIC CONTROLLED ROTATION AND ORIENTATION Patent
MARTIN B. BARMATZ, inventor (to NASA) and JAMES L. ALLEN, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 31 Jan. 1989 10 p Filed 29 Oct. 1986
(NASA-CASE-NPO-16995-1-CU; US-PATENT-4,800,756; US-PATENT-CLASS-73-505; US-PATENT-CLASS-73-571; US-PATENT-APPL-SN-924297) Avail: US Patent and Trademark Office CSCL 20A

Acoustic energy is applied to a pair of locations spaced about a chamber, to control rotation of an object levitated in the chamber. Two acoustic transducers applying energy of a single acoustic mode, one at each location, can (one or both) serve to levitate the object in three dimensions as well as control its rotation. Slow rotation is achieved by initially establishing a large phase difference and/or pressure ratio of the acoustic waves, which is sufficient to turn the object by more than 45 deg, which is immediately followed by reducing the phase difference and/or pressure ratio to maintain slow rotation. A small phase difference and/or pressure ratio enables control of the angular orientation of the object without rotating it. The sphericity of an object can be measured by its response to the acoustic energy.

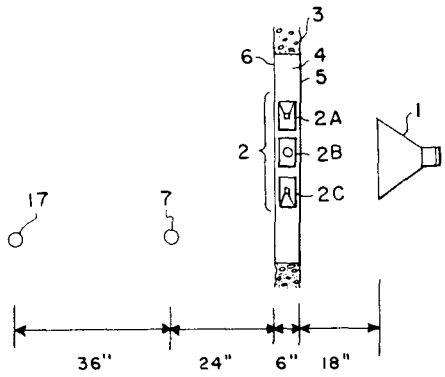
Official Gazette of the U.S. Patent and Trademark Office



N90-15710*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
SOUND ATTENUATION APPARATUS Patent Application
KEVIN P. SHEPHERD, inventor (to NASA) and M. W. A. FERDINAND GROSVELD, inventor (to NASA) (Planning Research Corp., Hampton, VA.) 10 Aug. 1989 11 p
(NASA-CASE-LAR-13968-1; NAS 1.71:LAR-13968-1; US-PATENT-APPL-SN-392165) Avail: NTIS HC A03/MF A01 CSCL 20A

An apparatus is disclosed for reducing acoustic transmission from mechanical or acoustic sources by means of a double wall partition, within which an acoustic pressure field is generated by at least one secondary acoustic source. The secondary acoustic source is advantageously placed within the partition, around its edges, or it may be an integral part of a wall of the partition.

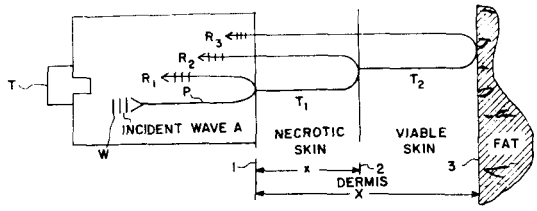
NASA



N90-17408*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
METHOD AND APPARATUS FOR CHARACTERIZING REFLECTED ULTRASONIC PULSES Patent Application
WILLIAM T. YOST, inventor (to NASA) and JOHN H. CANTRELL, inventor (to NASA) 17 Oct. 1989 32 p
(NASA-CASE-LAR-13966-1; NAS 1.71:LAR-13966-1; US-PATENT-APPL-SN-422726) Avail: NTIS HC A03/MF A01 CSCL 20A

The invention is a method of and apparatus for characterizing the amplitudes of a sequence of reflected pulses R1, R2, and R3 by converting them into corresponding electric signals E1, E2, and E3 to substantially the same value during each sequence thereby restoring the reflected pulses R1, R2, and R3 to their initial reflection values by timing means, an exponential generator, and a time gain compensator. Envelope and baseline reject circuits permit the display and accurate location of the time spaced sequence of electric signals having substantially the same amplitude on a measurement scale on a suitable video display or oscilloscope.

NASA



74

OPTICS

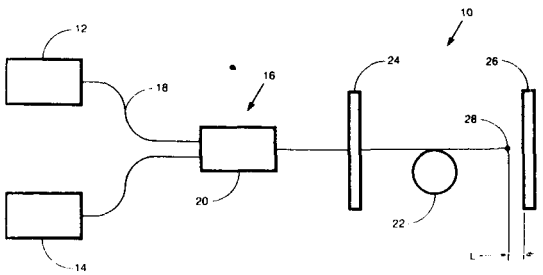
Includes light phenomena; and optical devices.

N90-15733*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
FIBER OPTIC SENSING SYSTEM Patent Application
GRIGORY ADAMOVSKY, inventor (to NASA) 7 Sep. 1989 14 p

(NASA-CASE-LEW-14795-1; NAS 1.71:LEW-14795-1; US-PATENT-APPL-SN-404291) Avail: NTIS HC A03/MF A01 CSCL 20F

A fiber optic interferometer utilizes a low coherence light emitting diode (LED) laser as a light source which is filtered and driven at two RF frequencies, high and low, that are specific to the initial length of the resonator chamber. A displacement of a reflecting mirror changes the length traveled by the nonreferencing signal. The low frequency light undergoes destructive interference which reduces the average intensity of the wave while the high frequency light undergoes constructive interference which increases the average intensity of the wave. The ratio of these two intensity measurements is proportional to the displacement incurred.

NASA



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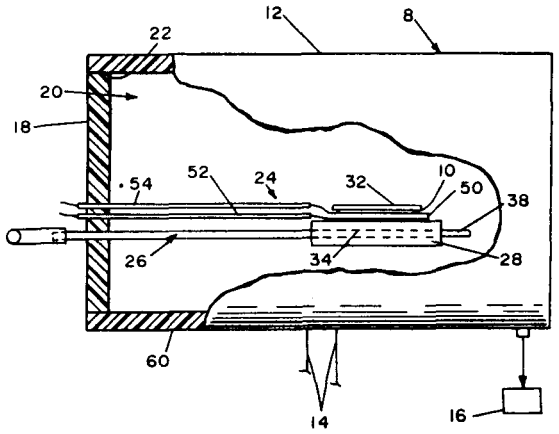
PLASMA PHYSICS

Includes magnetohydrodynamics and plasma fusion.

N90-10717*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.
METHOD AND APPARATUS FOR MAINTAINING THERMAL CONTROL IN PLASMA CONDITIONS Patent Application
ANN F. WHITAKER, inventor (to NASA) 28 Jul. 1989 10 p
(NASA-CASE-MFS-28368-1; NAS 1.71:MFS-28368-1; US-PATENT-APPL-SN-386174) Avail: NTIS HC A02/MF A01 CSCL 20I

An apparatus and method are disclosed for determining the effects of exposure of oxygen plasma on a thin film polymer whose bulk is maintained at a predetermined temperature. The apparatus includes a chamber having a specimen therein. A plasma environment is provided in the chamber. A closure member is provided for sealing the chamber after the specimen is introduced into the chamber. The closure member also serves as a support for the test apparatus which includes a cooling coil. A platform having the test specimen thereon is supported on the cooling coil to be cooled by coolant flowing through the cooling coils. A thermoelectric module is supported on the platform to assist in maintaining a low test temperature for the test samples. The temperature of the sample is monitored by a thermocouple probe which is in contact with the sample. Any change in bulk sample temperature caused by the thermocouple probe is quickly adjusted to maintain the initial bulk temperature by the thermoelectric module.

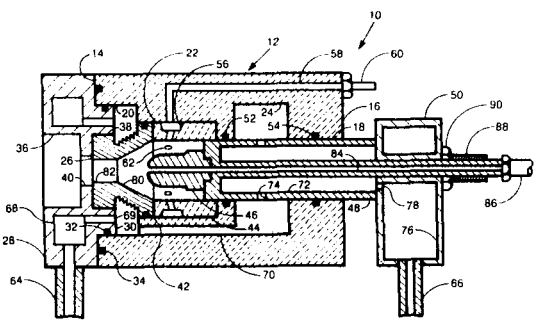
NASA



N90-10718*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
PLASMA GUN WITH COAXIAL POWDER FEED AND ADJUSTABLE CATHODE Patent Application
ISIDOR ZAPLATYNSKY, inventor (to NASA) 7 Jul. 1989 12 p
(NASA-CASE-LEW-14901-1; NAS 1.71:LEW-14901-1; US-PATENT-APPL-SN-376488) Avail: NTIS HC A03/MF A01 CSCL 20I

An improved plasma gun coaxially injects particles of ceramic materials having high melting temperatures into the central portion of a plasma jet. This results in a more uniform and higher temperature and velocity distribution of the sprayed particles. The position of the cathode is adjustable to facilitate optimization of the performance of the gun wherein grains of the ceramic material are melted at lower power input levels.

NASA



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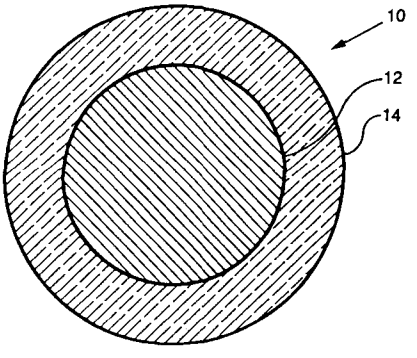
SOLID-STATE PHYSICS

Includes superconductivity.

N90-17454*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
METHOD OF FORMING LOW COST, FORMABLE HIGH T(SUBC) SUPERCONDUCTING WIRE Patent Application
JAMES L. SMIALEK, inventor (to NASA) 28 Dec. 1989 9 p Sponsored by NASA
(NASA-CASE-LEW-14676-2; US-PATENT-APPL-SN-458467; NAS 1.71:LEW-14676-2) Avail: NTIS HC A02/MF A01 CSCL 20L

A ceramic superconductivity part, such as a wire, is produced through the partial oxidation of a specially formulated copper alloy in a core. The alloys contains low level of quantities of rare earth and alkaline earth dopant elements. Upon oxidation at high temperatures, and superconducting oxide phases are formed as a thin film.

NASA

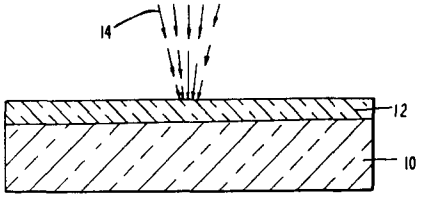


N90-17455*# National Aeronautics and Space Administration. Pasadena Office, CA.
FABRICATION OF NANOMETER SINGLE CRYSTAL METALLIC COSI2 STRUCTURES ON SI Patent Application
SIMON K. W. NIEH, inventor (to NASA), TRUE-LON LIN, inventor (to NASA), and ROBERT W. FATHAUER, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 10 Aug. 1989 12 p
(Contract NAS7-918)
(NASA-CASE-NPO-17736-1-CU; NAS 1.71:NPO-17736-1-CU; US-PATENT-APPL-SN-392166) Avail: NTIS HC A03/MF A01 CSCL 20L

Amorphous Co:Si (1:2 ratio) films are electron gun-evaporated on clean Si(111) substrates, such as in a molecular beam epitaxy system. These layers are then crystallized selectively with a focused electron beam to form very small crystalline CoSi2 regions in an amorphous matrix. Finally, the amorphous regions are etched away selectively using plasma or chemical techniques.

NASA

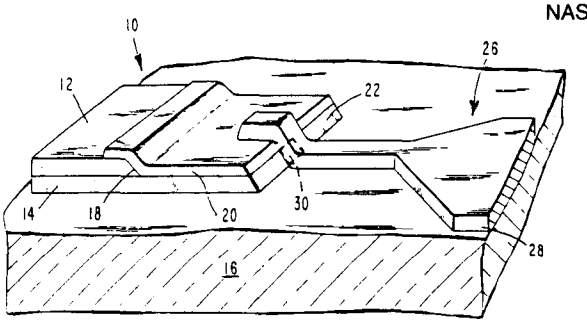
Fig. 1.



N90-17456*# National Aeronautics and Space Administration. Pasadena Office, CA.
EDGE GEOMETRY SUPERCONDUCTING TUNNEL JUNCTIONS UTILIZING AN NBN/MGO/NBN THIN FILM STRUCTURE Patent Application
BRIAN D. HUNT, inventor (to NASA) and HENRY G. LEDUC, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 1 Aug. 1989 14 p
(Contract NAS7-918)
(NASA-CASE-NPO-17812-1-CU; US-PATENT-APPL-SN-387928; NAS 1.71:NPO-17812-1-CU) Avail: NTIS HC A03/MF A01 CSCL 20L

An edge defined geometry is used to produce very small area tunnel junctions in a structure with niobium nitride superconducting electrodes and a magnesium oxide tunnel barrier. The incorporation of an MgO tunnel barrier with two NbN electrodes results in improved current-voltage characteristics, and may lead to better junction noise characteristics. The NbN electrodes are preferably sputter-deposited, with the first NbN electrode deposited on an insulating substrate maintained at about 250 to 500 C for improved quality of the electrode.

NASA



N90-19884* National Aeronautics and Space Administration. Pasadena Office, CA.
ANNEALING GROUP III-V COMPOUND DOPED SILICON-GERMANIUM ALLOY FOR IMPROVED THERMO-ELECTRIC CONVERSION EFFICIENCY Patent
JAN W. VANDERSANDE, inventor (to NASA), CHARLES WOOD, inventor (to NASA), and SUSAN L. DRAPER, inventor (to NASA) (California Inst. of Tech., Pasadena.) 18 Jul. 1989 8 p Filed 21 Apr. 1988
(NASA-CASE-NPO-17259-1-CU; US-PATENT-4,849,033; US-PATENT-APPL-SN-184234; US-PATENT-CLASS-148-13.1; US-PATENT-CLASS-148-13; US-PATENT-CLASS-437-903; US-PATENT-CLASS-428-641) Avail: US Patent and Trademark Office CSCL 20L

The thermoelectric conversion efficiency of a GaP doped SiGe alloy is improved about 30 percent by annealing the alloy at a temperature above the melting point of the alloy, preferably stepwise from 1200 C to 1275 C in air to form large grains having a size over 50 microns and to form a GeGaP rich phase and a silicon rich phase containing SiP and SiO2 particles.

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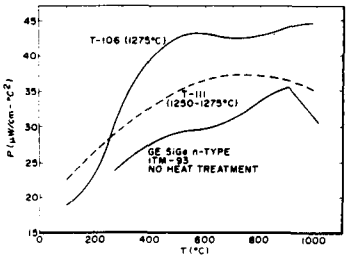

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Inquiries concerning the NASA Patent Licensing Program or the availability of licenses for the commercial use of NASA-owned inventions covered by U.S. patents or pending applications for patent should be forwarded to the NASA Patent Counsel of the NASA installation having cognizance of the specific invention, or the Associate General Counsel for Intellectual Property, code GP, National Aeronautics and Space Administration, Washington, D.C. 20546. Inquiries should refer to the NASA Case Number, the Title of the Invention, and the U.S. Patent Number or the U.S. Application Serial Number assigned to the invention as shown in *NASA PAB.*

The NASA Patent Counsel having cognizance of the invention is determined by the first three letters or prefix of the NASA Case Number assigned to the invention. The addresses of NASA Patent Counsels are listed alongside the NASA Case Number prefix letters in the following table.

STANDING ORDER SUBSCRIPTIONS

NASA SP-7039, Section 1 and its supplements are available from the National Technical Information Service (NTIS) on standing order subscription as PB 90-911100 at the price of $15.00 domestic and $30.00 foreign. Standing order subscriptions do not terminate at the end of a year, as do regular subscriptions, but continue indefinitely unless specifically terminated by the subscriber.

NASA Case Number Prefix Letters	Address of Cognizant NASA Patent Counsel
ARC-xxxxx XAR-xxxxx	Ames Research Center Mail Code: 200-11A Moffett Field, California 94035 Telephone: (415) 694-5104
ERC-xxxxx XER-xxxxx HQN-xxxxx XHQ-xxxxx	NASA Headquarters Mail Code: GP Washington, D.C. 20546 Telephone: (202) 453-2417
GSC-xxxxx XGS-xxxxx	Goddard Space Flight Center Mail Code: 204 Greenbelt, Maryland 20771 Telephone: (301) 286-7351
KSC-xxxxx XKS-xxxxx	John F. Kennedy Space Center Mail Code: PT-PAT Kennedy Space Center, Florida 32899 Telephone: (305) 867-2544
LAR-xxxxx XLA-xxxxx	Langley Research Center Mail Code: 279 Hampton, Virginia 23365 Telephone: (804) 865-3725
LEW-xxxxx XLE-xxxxx	Lewis Research Center Mail Code: 500-318 21000 Brookpark Road Cleveland, Ohio 44135 Telephone: (216) 433-5753
MSC-xxxxx XMS-xxxxx	Lyndon B. Johnson Space Center Mail Code: AL3 Houston, Texas 77058 Telephone: (713) 483-4871
MFS-xxxxx XMF-xxxxx	George C. Marshall Space Flight Center Mail Code: CC01 Huntsville, Alabama 35812 Telephone: (205) 544-0024
NPO-xxxxx XNP-xxxxx FRC-xxxxx XFR-xxxxx WOO-xxxxx	NASA Resident Legal Office Mail Code: 180-801 4800 Oak Grove Drive Pasadena, California 91103 Telephone: (818) 354-2700

PATENT LICENSING REGULATIONS

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

14 CFR Part 1245

Licensing of NASA Inventions

AGENCY: National Aeronautics and Space Administration
ACTION: Interim regulation with comments requested.

SUMMARY: The National Aeronautics and Space Administration (NASA) is revising its patent licensing regulations to conform with Pub. L. 96-517. This interim regulation provides policies and procedures applicable to the licensing of federally owned inventions in the custody of the National Aeronautics and Space Administration, and implements Pub. L. 96-517. The object of this subpart is to use the patent system to promote the utilization of inventions arising from NASA supported research and development.

EFFECTIVE DATE: July 1, 1981. Comments must be received in writing by December 2, 1981. Unless a notice is published in the **Federal Register** after the comment period indicating changes to be made, this interim regulation shall become a final regulation.

ADDRESS: Mr. John G. Mannix, Director of Patent Licensing, GP-4, NASA, Washington, D.C. 20546

FOR FURTHER INFORMATION CONTACT:
Mr. John G. Mannix, (202) 755-3954.

SUPPLEMENTARY INFORMATION:

PART 1245—PATENTS AND OTHER INTELLECTUAL PROPERTY RIGHTS

Subpart 2 of Part 1245 is revised to read as follows:

* * * * *

Subpart 2—Licensing of NASA Inventions

Sec.

Restrictions and Conditions

Types of Licenses

Procedures

Authority: 35 U.S.C. Section 207 and 208.94 Stat 3023 and 3024.

* * * * *

Subpart 2—Licensing of NASA Inventions

§ 1245.200 Scope of subpart.

This subpart prescribes the terms, conditions and procedures upon which a NASA invention may be licensed. It does not affect licenses which (a) were in effect prior to July 1, 1981; (b) may exist at the time of the Government's acquisition of title to the invention, including those resulting from the allocation of rights to inventions made under Government research and development contracts; (c) are the result of an authorized exchange of rights in the settlement of patent disputes; or (d) are otherwise authorized by law or treaty.

§ 1245.201 Policy and objective.

It is the policy and objective of this subpart to use the patent system to promote the utilization of inventions arising from NASA supported research and development.

§ 1245.202 Definitions

(a) "Federally owned invention" means an invention, plant, or design which is covered by a patent, or patent application in the United States, or a patent, patent application, plant variety protection, or other form of protection, in a foreign country, title to which has been assigned to or otherwise vested in the United States Government.

(b) "Federal agency" means an executive department, military department, Government corporation, or independent establishment, except the Tennessee Valley Authority, which has custody of a Federally owned invention.

(c) "NASA Invention" means a Federally owned invention with respect to which NASA maintains custody and administration, in whole or in part, of the right, title or interest in such invention on behalf of the United States Government.

(d) "Small business firm" means a small business concern as defined at section 2 of Pub. L. 85-536 (15 U.S.C. 632) and implementing regulations of the Administrator of the Small Business Administration. For the purpose of these regulations, the size standard for small business concerns involved in Government procurement, contained in 13 CFR 121.3-8, and in subcontracting, contained in 13 CFR 121.3-12, will be used.

(e) "Practical application" means to manufacture in the case of a composition or product, to practice in the case of a process or method, or to operate in the case of a machine or system; and, in each case, under such condition, as to establish that the invention is being utilized and that its benefits are to the extent permitted by law or Government regulations available to the public on reasonable terms.

(f) "United States" means the United States of America, its territories and possessions, the District of Columbia, and the Commonwealth of Puerto Rico.

§ 1245.203 Authority to grant licenses.

NASA inventions shall be made available for licensing as deemed appropriate in the public interest. NASA may grant nonexclusive, partially exclusive, or exclusive licenses thereto under this subpart on inventions in its custody.

Restrictions and Conditions

§ 1245.204 All licenses granted under this subpart.

(a) *Restrictions.* (1) A license may be granted only if the applicant has supplied NASA with a satisfactory plan for development or marketing of the invention, or both, and with information about the applicant's capability to fulfill the plan.

(2) A license granting rights to use or sell under a NASA invention in the United States shall normally be granted only to a licensee who agrees that any products embodying the invention or produced through the use of the invention will be manufactured substantially in the United States.

(b) *Conditions.* Licenses shall contain such terms and conditions as NASA determines are appropriate for the protection of the interests of the Federal Government and the public and are not in conflict with law or this subpart. The following terms and conditions apply to any license:

(1) The duration of the license shall be for a period specified in the license agreement, unless sooner terminated in accordance with this subpart.

(2) The license may be granted for all or less than all fields of use of the invention or in specified geographical areas, or both.

(3) The license may extend to subsidiaries of the licensee or other parties if provided for in the license but shall be nonassignable without approval of NASA, except to the successor of that part of the licensee's business to which the invention pertains.

(4) The license may provide the licensee the right to grant sublicenses under the license, subject to the approval of NASA. Each sublicense shall make reference to the license, including the rights retained by the Government, and a copy of such sublicense shall be furnished to NASA.

(5) The license shall require the licensee to carry out the plan for development or marketing of the invention, or both, to bring the invention to practical application within a period specified in the license, and to continue to make the benefits of the invention reasonably accessible to the public.

(6) The license shall require the licensee to report periodically on the utilization or efforts at obtaining utilization that are being made by the licensee, with particular reference to the plan submitted.

(7) All licenses shall normally require royalties or other consideration.

(8) Where an agreement is obtained pursuant to § 1245.204(a)(2) that any products embodying the invention or produced through use of the invention will be manufactured substantially in the United States, the license shall recite such agreement.

(9) The license shall provide for the right of NASA to terminate the license, in whole or in part, if:

(i) NASA determines that the licensee is not executing the plan submitted with its request for a license and the licensee cannot otherwise demonstrate to the satisfaction of NASA that it has taken or can be expected to take within a reasonable time effective steps to achieve practical application of the invention;

(ii) NASA determines that such action is necessary to meet requirements for public use specified by Federal regulations issued after the date of the license and such requirements are not reasonably satisfied by the licensee;

(iii) The licensee has willfully made a false statement of or willfully omitted a material fact in the license application or in any report required by the license agreement; or

(iv) The licensee commits a substantial breach of a covenant or agreement contained in the license.

(10) The license may be modified or terminated, consistent with this subpart, upon mutual agreement of NASA and the licensee.

(11) Nothing relating to the grant of a license, nor the grant itself, shall be construed to confer upon any person any immunity from or defenses under the antitrust laws or from a charge of patent misuse, and the acquisition and use of rights pursuant to this subpart shall not be immunized from the operation of state or Federal law by reason of the source of the grant.

Types of Licenses

§ 1245.205 Nonexclusive licenses.

(a) *Availability of licenses.* Nonexclusive licenses may be granted under NASA inventions without publication of availability or notice of a prospective license.

(b) *Conditions.* In addition to the provisions of § 1245.204, the nonexclusive license may also provide that, after termination of a period specified in the license agreement, NASA may restrict the license to the fields of use or geographic areas, or both, in which the licensee has brought the invention to practical application and continues to make the benefits of the invention reasonably accessible to the public. However, such restriction shall be made only in order to grant an exclusive or partially exclusive license in accordance with this subpart.

§ 1245.206 Exclusive and partially exclusive licenses.

(a) Domestic licenses.

(1) *Availability of licenses.* Exclusive or partially exclusive licenses may be granted on NASA inventions: (i) 3 months after notice of the invention's availability has been announced in the **Federal Register;** or (ii) without such notice where NASA determines that expeditious granting of such a license will best serve the interests of the Federal Government and the public; and (iii) in either situation, specified in (a)(1)(i) or (ii) of this section only if:

(A) Notice of a prospective license, identifying the invention and the prospective licensee, has been published in the **Federal Register,** providing opportunity for filing written objections within a 60-day period;

(B) After expiration of the period in § 1245.206(a)(1)(iii)(A) and consideration of nay written objections received during the period, NASA has determined that:

(*1*) The interests of the Federal Government and the public will best be served by the proposed license, in view of the applicant's intentions, plans, and ability to bring the invention to practical application or otherwise promote the invention's utilizaiton by the public;

(*2*) The desired practical application has not been achieved, or is not likely expeditiously to be achieved, under any nonexclusive license which has been granted, or which may be granted, on the invention;

(*3*) Exclusive or partially exclusive licensing is a reasonable and necessary incentive to call forth the investment of risk capital and expenditures to bring the invention to practical application or otherwise promote the invention's utilization by the public; and

(*4*) The proposed terms and scope of exclusivity are not greater than reasonably necessary to provide the incentive for bringing the invention to practical application or otherwise promote the invention's utilization by the public;

(C) NASA has not determined that the grant of such license will tend substantially to lessen competition or result in undue concentration in any section of the country in any line of commerce to which the technology to be licensed relates, or to create or maintain other situations inconsistent with the antitrust laws; and

(D) NASA has given first preference to any small business firms submitting plans that are determined by the agency to be within the capabilities of the firms and as equally likely, if executed, to bring the invention to practical application as any plans submitted by applicants that are not small business firms.

(2) *Conditions.* In addition to the provisions of § 1245.204, the following terms and conditions apply to domestic exclusive and partially exclusive licenses:

(i) The license shall be subject to the irrevocable, royalty-free right of the Government of the United States to practice and have practiced the invention on behalf of the United States and on behalf of any foreign government or international organization pursuant to any existing or future treaty or agreement with the United States.

(ii) The license shall reserve to NASA the right to require the licensee to grant sublicenses to responsible applicants, on reasonable terms, when necessary to fulfill health or safety needs.

(iii) The license shall be subject to any licenses in force at the time of the grant of the exclusive or partially exclusive license.

(iv) The license may grant the licensee the right of enforcement of the licensed patent pursuant to the provisions of Chapter 29 of Title 35, United States Code, or other statutes, as determined appropriate in the public interest.

(b) Foreign licenses.

(1) *Availability of licenses.* Exclusive or partially exclusive licenses may be granted on a NASA invention covered by a foreign patent, patent application, or other form of protection, provided that:

(i) Notice of a prospective license, identifying the invention and prospective licensee, has been published in the **Federal Register,** providing opportunity for filing written objections within a 60-day period and following consideration of such objections;

(ii) NASA has considered whether the interests of the Federal Government or United States industry in foreign commerce will be enhanced; and

(iii) NASA has not determined that the grant of such license will tend substantially to lessen competition or result in undue concentration in any section of the United States in any line of commerce to which the technology to be licensed relates, or to create or maintain other situations inconsistent with antitrust laws.

(2) *Conditions.* In addition to the provisions of § 1245.204, the following terms and conditions apply to foreign exclusive and partially exclusive licenses:

(i) The license shall be subject to the irrevocable, royalty-free right of the Government of the United States to practice and have practiced the invention on behalf of the United States and on behalf of any foreign government or international organization pursuant to any existing or future treaty or agreement with the United States.

(ii) The license shall be subject to any licenses in force at the time of the grant of the exclusive or partially exclusive license.

(iii) The license may grant the licensee the right to take any suitable and necessary actions to protect the licensed property, on behalf of the Federal Government.

(c) *Record of determinations.* NASA shall maintain a record of determinations to grant exclusive or partially exclusive licenses.

Procedures

§ 1245.207 Application for a license.

An application for a license should be addressed to the Patent Counsel at the NASA installation having responsibility for the invention and shall normally include:

(a) Identification of the invention for which the license is desired, including the patent application serial number or patent number, title, and date, if known;

(b) Identification of the type of license for which the application is submitted;

(c) Name and address of the person, company, or organization applying for the license and the citizenship or place of incorporation of the applicant;

(d) Name, address, and telephone number of representative of applicant to whom correspondence should be sent;

(e) Nature and type of applicant's business, identifying products or services which the applicant has successfully commercialized, and approximate number of applicant's employees;

(f) Source of information concerning the availability of a license on the invention;

(g) A statement indicating whether applicant is a small business firm as defined in § 1245.202(c);

(h) A detailed description of applicant's plan for development or marketing of the invention, or both, which should include:

(1) A statement of the time, nature and amount of anticipated investment of capital and other resources which applicant believes will be required to bring the invention to practical application;

(2) A statement as to applicant's capability and intention to fulfill the plan, including information regarding manufacturing, marketing, financial, and technical resources;

(3) A statement of the fields of use for which applicant intends to practice the invention; and

(4) A statement of the geographic areas in which applicant intends to manufacture any products embodying the invention and geographic areas where applicant intends to use or sell the invention, or both;

(i) Identification of licenses previously granted to applicant under Federally owned inventions;

(j) A statement containing applicant's best knowledge of the extent to which the invention is being practiced by private industry or Government, or both, or is otherwise available commercially; and

(k) Any other information which applicant believes will support a determination to grant the license to applicant.

§ 1245.208 Processing applications.

(a) Applications for licenses will be initially reviewed by the Patent Counsel of the NASA installation having responsibility for the invention. The Patent Counsel shall make a preliminary recommendation to the Director of Licensing, NASA Headquarters, whether to: (1) grant the license as requested, (2) grant the license with modification after negotiation with the licensee, or (3) deny the license. The Director of Licensing shall review the preliminary recommendation of the Patent Counsel and make a final recommendation to the NASA Assistant General Counsel for Patent Matters. Such review and final recommendation may include, and be based on, any additional information obtained from applicant and other sources that the Patent Counsel and the Director of Licensing deem relevant to the license requested. The determination to grant or deny the license shall be made by the Assistant General Counsel for Patent Matters based on the final recommendation of the Director of Licensing.

(b) When notice of a prospective exclusive or partially exclusive license is published in the **Federal Register** in accordance with § 1245.206(a)(1)(iii)(A) or § 1245.206(b)(1)(i), any written objections received in response thereto will be considered by the Director of Licensing in making the final recommendation to the Assistant General Counsel for Patent Matters.

(c) If the requested license, including any negotiated modifications, is denied by the Assistant General Counsel for Patent Matters, the applicant may request reconsideration by filing a written request for reconsideration within 30 days after receiving notice of denial. This 30-day period may be extended for good cause.

(d) In addition to, or in lieu of requesting reconsideration, the applicant may also appeal the denial of the license in accordance with § 1245.211.

§ 1245.209 Notice to Attorney General.

A copy of the notice provided for in §§ 1245.206(a)(1)(iii)(A), and 1245.206(b)(1)(i) will be sent to the Attorney General.

§ 1245.210 Modification and termination of licenses.

Before modifying or terminating a license, other than by mutual agreement, NASA shall furnish the licensee and any sublicensee of record a written notice of intention to modify or terminate the license, and the licensee and any sublicensee shall be allowed 30 days after such notice to remedy any breach of the license or show cause why the license should not be modified or terminated.

§ 1245.211 Appeals.

(a) The following parties may appeal to the NASA Administrator or designee any decision or determination concerning the grant, denial, interpretation, modification, or termination of a license:

(1) A person whose application for a license has been denied;

(2) A licensee whose license has been modified or terminated, in whole or in part; or

(3) A person who timely filed a written objection in response to the notice required by §§ 1245.206(a)(1)(iii)(A) or 1245.206(b)(1)(i) and who can demonstrate to the satisfaction of NASA that such person may be damaged by the Agency action.

(b) Written notice of appeal must be filed within 30 days (or such other time as may be authorized for good cause shown) after receiving notice of the adverse decision or determination; including, an adverse decision following the request for reconsideration under § 1245.208(c). The notice of appeal, along with all supporting documentation should be addressed to the Administrator, National Aeronautics and Space Administration, Washington, DC 20546. Should the appeal raise a genuine dispute over material facts, fact-finding will be conducted by the NASA Inventions and Contributions Board. The person filing the appeal shall be afforded an opportunity to be heard and to offer evidence in support of the appeal. The Chairperson of the Inventions and Contributions Board shall prepare written findings of fact and transmit them to the Administrator or designee. The decision on the appeal shall be made by the NASA Administrator or designee. There is no further right of administrative appeal from the decision of the Administrator or designee.

§ 1245.212 Protection and administration of inventions.

NASA may take any suitable and necessary steps to protect and administer rights to NASA inventions, either directly or through contract.

§ 1245.213 Transfer of custody.

NASA having custody of certain Federally owned inventions may transfer custody and administration in whole or in part, to another Federal agency, of the right, title, or interest in any such invention.

§ 1245.214 Confidentiality of information.

Title 35, United States Code, section 209, provides that any plan submitted pursuant to § 1245.207(h) and any report required by § 1245.204(b)(6) may be treated by NASA as commercial and financial information obtained from a person and privileged and confidential and not subject to disclosure under section 552 of Title 5 of the United States Code.

James M. Beggs,

Administrator.

October 15, 1981.

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15. Supplementary Notes

Section 1: Abstracts

16. Abstract

Abstracts are provided for 76 patents and patent applications entered into the NASA scientific and technical information system during the period January 1990 through June 1990. Each entry consists of a citation, an abstract, and in most cases, a key illustration selected from the patent or patent application.

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